UNIVERSITY OF CALIFORNIA ACADEMIC SENATE •MERCED DIVISION

Committee on Library & Scholarly Communication (LASC)
Monday, October 26, 2015
1:30 – 3:00 pm
KL 362
Documents found at UCM Box "LASC AY 15-16"

AGENDA

I. Welcome and Introductions **1:30 – 1:35**

This is the inaugural year of LASC. It was approved as a new, standing Senate committee by the Division Council of the Academic Senate in AY 14-15. Prior to the empaneling of this committee, library functions were under the purview of the Senate Committee on Research (COR). It was COR, who, in AY 14-15, re-initiated the conversation in the Senate about the creation of a separate Senate committee for library issues, which was the original recommendation from the Senate-Administration Library Working Group in AY 13-14.

LASC's roster and bylaws are appended to this meeting packet. **Pg. 1-5**

II. Chair's Report – Karl Ryavec **1:35 – 2:00**

A. Updates from October 23 UCOLASC meeting
The University Committee on Library and Scholarly Communications is the systemwide committee that corresponds to Merced's LASC. Chair Ryavec is Merced's representative to UCOLASC.
B. Communication between Faculty and the Library
C. Collection Development and Review
   i. Availability of print books
   ii. Interlibrary loan issues
D. Advocacy for Library Budget
E. Digital Publications and Data Archiving
F. 2020 Planning

III. Report from University Librarian – Haipeng Li **2:00 – 2:15**

- Library Strategic Planning
- Librarian Liaison System
- Library Short Term Planning Proposal **Pg. 6-13**

IV. Report from CIO – Ann Kovalchick **2:15 – 2:30** **Pg. 14-72**

- Current IT Advisory Committee that governs IT and guides priorities
- IT workforce plan
- IT efforts on CyberInfrastructure

V. Agenda Items – Karl Ryavec **2:30 – 3:00**

A. Senate-Administration Library Working Group AY 13-14 **Pg. 73-81**

The Working Group met three times in that year and submitted a final report to the Senate Chair and Provost/EVC. The meeting minutes and final report are appended to this packet. The main recommendation in the report was the formulation of a dedicated committee for library and scholarly communication issues.

Additional information can be found in the Library Working group subfolder on the LASC Box site.

VI. Informational Items

A. AY 14-15 COR annual report **Pg. 82-94**

VII. Other Business

LASC ROSTER AY 2015-2016		
Name	Email	School
Karl Ryavec, Chair*	kryavec@ucmerced.edu	SSHA
Will Shadish, CAPRA representative	wshadish@ucmerced.edu	SSHA
Michael Scheibner, COR representative	mscheibner@ucmerced.edu	SNS
Victor Munoz, GC representative	vmunoz3@ucmerced.edu	SOE
Sholeh Quinn, UGC representative	squinn@ucmerced.edu	SSHA
Haipeng Li, University Librarian**	hli58@ucmerced.edu	Library
Ann Kovalchick, CIO and AVC of Information Technology**	akovalchick@ucmerced.edu	IT
Mina Naghshnejad, Graduate Student representative	mnaghshnejad@ucmerced.edu	GSA
Andre Frise, Undergraduate Student representative	afrise@ucmerced.edu	ASUCM
SENATE STAFF		
Simrin Takhar, LASC Analyst	stakhar@ucmerced.edu	Senate Office

*UCOLASC representative

**Ex-officio, non-voting members

LASC MEETING SCHEDULE AY 2015-2016 **Call-in information: 1-866-740-1260, access code 2092289**		
Month	Day and Time	Room
Fall 2015		
October	26 @ 1:30 – 3:00 pm	KL 362
Spring 2016		
TBD	TBD	TBD

The following Bylaws describe the duties and responsibilities of the UCM Committee on Library and Scholarly Communication and the corresponding systemwide committee of UCOLASC.

UC Merced Bylaw Part II.IV.4

4. Library and Scholarly Communication
   A. Membership: This Committee consists of at least four members of the Merced Division and two student members. Representation includes four individuals who are contemporarily members of the Committee on Research, Committee on Academic Planning and Resource Allocation, and Graduate Council, respectively. The Committee also includes one graduate student member and one undergraduate student member. The University Librarian and the Chief Information Officer serve as *ex-officio*.
   B. Duties
      1. Advises the Chancellor or Chancellor's designee and the Division regarding the administration of the University Library, in accordance with the Standing Orders of the Regents.
      2. Makes recommendations to the Division on matters concerning the role of the University Library in the acquisition, storage, and provision of scholarly materials, as well as other resources for scholarly communication. These matters include, but are not restricted to, the formulation of University Library policies, the management of the University Library budget, the apportionment of related funds, and the allocation of associated space.
      3. Maintains liaison with the administration of the University Library on behalf of the Division.
      4. Prepares and submits to the Division an annual report on the status of the University Library, as well as related resources for scholarly communication.

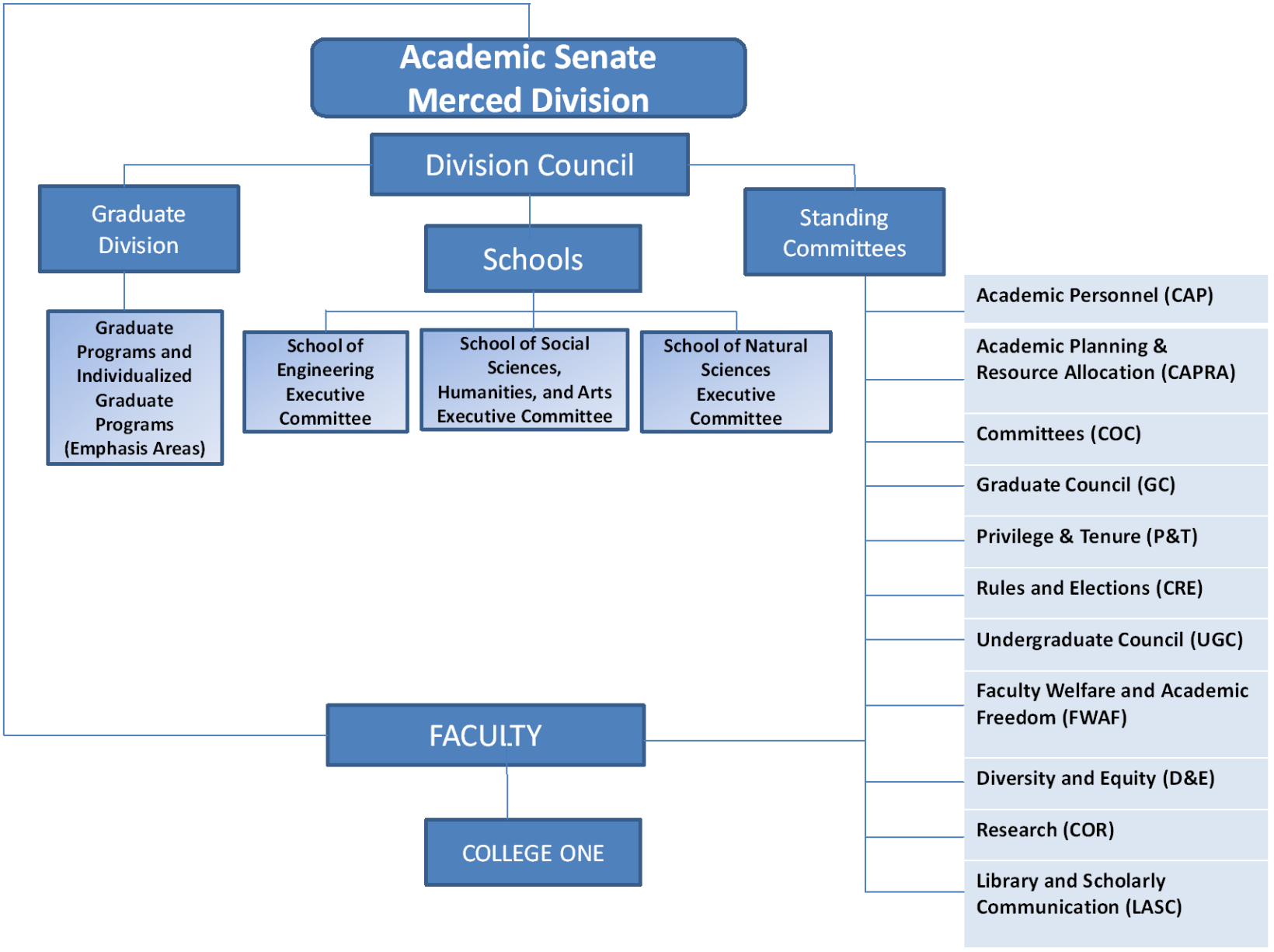
Systemwide Bylaw II.IV.185

185. Library and Scholarly Communication (Am 9 May 2007)

A. Membership shall be determined in accordance with Bylaw 128. One undergraduate student and one graduate student shall sit with the Committee. [See Bylaw 128.E.] The Vice Chair shall be chosen in accordance with Bylaw 128.D.2. and 3. A University librarian and the Chair of the Committee on Information Technology and Telecommunications Policy shall serve ex officio. Up to three at-large members, appointed for one-year renewable terms, and in consultation

with the Chair of the Committee, to supplement the expertise of divisional members in areas of special relevance to the current business of the committee. (Am 7 May 87; Am 28 May 2003; Am 9 May 2007)

B. Duties. Consistent with Bylaw 40, the Committee shall: (Am 28 May 2003)
    1. Advise the President concerning the administration of the libraries of the University in accordance with the Standing Orders of The Regents and issues related to innovations in forms of scholarly communication. (Am 9 May 2003; Am 9 May 2007)
    2. Perform such other appropriate duties as may be committed to the Academic Senate by proper authority.


Academic Senate
Merced Division
Division Council
Graduate Division
Schools
Standing Committees
Graduate Programs and Individualized Graduate Programs (Emphasis Areas)
School of Engineering Executive Committee
School of Social Sciences, Humanities, and Arts Executive Committee
School of Natural Sciences Executive Committee
Academic Personnel (CAP)
Academic Planning & Resource Allocation (CAPRA)
Committees (COC)
Graduate Council (GC)
Privilege & Tenure (P&T)
Rules and Elections (CRE)
Undergraduate Council (UGC)
Faculty Welfare and Academic Freedom (FWAF)
Diversity and Equity (D&E)
Research (COR)
Library and Scholarly Communication (LASC)
FACULTY
COLLEGE ONE

STUDENT PARTICIPATION ON SENATE COMMITTEES

A. In accordance with UCM Bylaws, student representatives may sit on the following committees:
   - Committee on Academic Planning and Resource Allocation
   - Graduate Council
   - Library and Scholarly Communication
   - Undergraduate Council

B. Student representatives are nominated for one-year terms by their undergraduate and graduate student associations to sit with Academic Senate committees. Their seating is subject to ratification by the Committee on Committees, which, by right, may also withdraw the privilege from student representatives who violate the rules of conduct, or, in flagrant instances, debar any student representatives from the committee in question for a specific period of time. Failure of the student organizations to provide appointee(s) will not interfere with the ongoing function of the Merced Divisional committees.

C. Student representatives have the privilege of the floor at committee meetings. They may ask for their positions to be recorded in the minutes (if any), but will not vote or enjoy the other rights reserved for voting members.

D. Student representatives will not be present during discussions of confidential matters, nor have access to documents pertinent to such discussions. Normally, confidential matters are defined as those pertaining to any individual member of the academic community, but when warranted, a committee Chair may declare any other matter confidential.

E. Student representatives may report to their constituencies on committee transactions, but, both as a courtesy and to confirm the accuracy in reporting, are recommended to show a copy of any report to the Chair of the committee in question prior to its dissemination.

F. Student representatives on committees have the right to participate in committee deliberations but do not have voting privileges. On all formal votes in such committees, the student opinions will be recorded and reported separately.

UC Merced Library Short Term Planning for FY 15-16 to FY 17-18
August 5, 2015

The mission of the UC Merced Library is to achieve excellence by meeting the diverse research, teaching, and public service needs of UC Merced researchers (students, faculty and staff) with targeted, quality collections and relevant services that effectively and efficiently support the research life-cycle of finding, using, creating, and managing information. With the goal of supporting the mission of the University—the first American research university of the 21st century—and in preparation for the rapid campus expansion, faculty and student increases, and the growth of teaching and research areas, the UCM Library needs to maintain a high level of performance with the resources needed to meet the needs of the campus community.

As it stands, the Library lacks the necessary support to meet these important academic needs. While the Library is exploring options to maximize the use of its existing resources, we have identified areas in need of support in order to meet the diverse needs of the various constituencies campus-wide. This short term proposal attempts to address the immediate needs of the Library while paving the way for a longer range planning process for the future development of the Library. The goal is to develop a sound plan in order to build a sustainable academic library to support the first American research university of the 21st century. The proposal identifies and outlines the Library's support needs for the next two-three years in four areas: Collections, Research Services, Digital Assets, and Operations.

Collections

The Library's collections budget has faced major challenges over the past several years as the rate of inflation in journal prices during this period (as documented in the *Library Journal* "Periodicals Price Survey") has hovered at an average of 6% per year. The expert consensus is that inflation in the prices of both journals and books (print and electronic) will remain at 6% to 7% for the coming year. In addition, the rapid growth of faculty and student populations has also posed serious challenges. Examples include inadequate financial capacity to fulfill a backlog of faculty requests for additional subscription journals and databases(see Appendix A). In addition, the Library has not been able to support faculty, particularly those in the arts and humanities for their requests of monographs, both print or electronic. In order to carry out the mission of Collection Services over the next two-to-three years, significant budget increases are required (see Appendix B.)

Research Support Services

The mission of UC Merced Library's Research And Learning Services (RLS) is to support faculty and student access to high quality information and help students develop as capable, independent researchers. In order to minimally carry out the mission of RLS over the next two-to-three years, the Library seeks the following new position:

Library Marketing Coordinator[1]
Opportunity: Communication between the Library and the campus community is critical to the success of learning, teaching and research. This position will help increase student and faculty awareness of critical Library resources and services, enhance student and faculty engagement with the Library, and express the value of the Library to the campus community.

Threat: Students and faculty remain unaware of valuable Library resources and services that enhance learning and research.

Principal Duties: Works with librarians and other Library staff to communicate information about the Library's resources, services, and spaces to UC Merced students, faculty, and staff. Manages content for the Library's website, digital signage, social media, and traditional communications outlets.

Digital Assets—Center for Digital Scholarship

The Digital Assets unit is building distinctive, world-class digital collections that reflect the contributions of UC Merced to research, education, and the community. While exploration of collaborating/partnership with IT is continuing, the Library has also identified distinct areas where specific support is needed in order to fulfill the mission of Digital Assets. To accomplish this goal, the following resources are needed:

Outreach Specialist
Opportunity: Hire, for two years, a Council on Library and Information Resources post-doctoral fellow who is well positioned to conduct deep level dialogs with faculty in highly specialized areas to enhance data-management practices across the entire campus.

Threats: Loss of research data and other digital intellectual assets created by campus researchers. Sanctions for failing to comply with granting-agency requirements for sharing and preserving data.

Principal Duties: Liaison with researchers and scholars. Provides training in managing digital assets. Promotes Digital Assets services.

Metadata Specialist
Opportunity: Information specialist who specializes in metadata creation, processing, preservation and dissemination. Apply the skills and knowledge of a metadata specialist so that digital assets created by campus researchers and scholars can be preserved, aggregated with other collections, and shared for broader public access over the long-term.

Threat: Without this expertise, the intellectual assets created by campus researchers will be underutilized and go unappreciated by the larger world.

[1] For salary information on all requested positions, see Appendix D

Primary Duties: Adds value to the products of campus research through the application of metadata best practices.

Digital Assets Operating Budget See appendix C

Library Operations

The current Library operations budget is $442,000 per year. While the Library can maintain basic operations, the current operations budget does not allow us to take on any new projects to enhance spaces or technologies for the benefit of Library users—in particular, UC Merced students. An increase of 10% per year over the next three years will allow the Library to continue to innovate and provide the exceptional library environment UC Merced students and faculty have come to expect.

In addition, the following position is requested to support Library effectiveness.

Decision Support & Assessment Specialist

Opportunity: Coordinates assessment activities related to the Library with the campus assessment specialists. Measure the effectiveness of Library services to ensure that the Library continues to meet its mission and objectives as well as those of the university.

Threat: Library leadership will lack data for effective strategic planning, prioritization, and ongoing improvement of operations.

Principal Duties: Works with Library staff to establish metrics and track the performance and quality of Library services (public services, academic support, collections) using a range of assessment methodologies. Coordinates with the campus assessment officer to provide data as needed.

Appendix A
Itemized Faculty Requests

Resource	Cost		P.A./One Time	Requested By
DSM V	$5,400		P.A.	Alexander Kishlavsky et al.
Archivium Ottomanicum	$300		P.A.	Sholeh Quinn
Central Asiatic Journal	$500		P.A.	Sholeh Quinn
SEM Journal	$1,000		P.A.	Will Shadish
Data Archive Membership	$3,850		P.A.	Stephanie Shih
Hoover's	$10,000		P.A.	Erik Rolland et al.
13 Public Health Journals	$19,000		P.A.	Paul Brown et al.
JoVE Neuroscience & JoVE Chemistry	$13,000		P.A.	Jennifer Manilay et al.
Journal of Water Resources Planning and Management	$1,000		P.A.	David Rheinheimer
Methods in Ecology and Evolution	$1,500		P.A.	Jessica Blois
Database Access Fees	$1,200		P.A.	
	Subtotal	$56,750		
Wiley Encyclopedia of Management	$1,800		One Time	Fanis Tsoulouhas
Calendar of State Papers	$25,000		One Time	Susan Amussen
Slavery, Abolition and Social Justice	$20,000		One Time	Susan Amussen
Ethnographic Video Online Vol. 2	$15,000		One Time	Robin DeLugan
	Subtotal	$61,800		
Total		$118,550		

Appendix B
Collections Budget Request

Permanent Increases to Base Budget				
	FY15-16	FY16-17	FY17-18	3-year Totals
Direct Faculty Requests				
Existing Backlog	$58,000			$58,000
Current Faculty New Requests	$25,000	$25,000	$25,000	$75,000
New Faculty Requests	$125,000	$125,000	$125,000	$375,000
Total Faculty Requests [1]	$208,000	$150,000	$150,000	$508,000
Books: Print & Electronic [2]	$30,000	$30,000	$30,000	$90,000
Inflation				
CDL Resources	$26,100	$26,900	$27,700	$80,700
Local Resources	$27,800	$43,500	$55,900	$127,200
Total Inflation [3]	$53,900	$70,400	$83,600	$207,900
Yearly Permanent Totals	$291,900	$250,400	$263,600	$805,900
3-Year Permanent Increase				$805,900
One-Time Expenditure				
Total Databases [4]	$61,000			$61,000
Yearly Totals	$352,900	$250,400	$263,600	
Total 3-Year Expenditure				**$866,900**

[1] $58,000 in increased permanent funding to address the existing backlog of direct faculty requests for journals and databases. $25,000 in increased permanent funding to meet anticipated new requests from existing faculty. $125,000 in increased permanent funding to support an estimated 25 new faculty per year at $5,000 per faculty member, an amount which supports purchasing thirty-five books per year or initiating three journal subscriptions per faculty member. Optionally, a figure of $3,000 per faculty member per year ($120,000 per year) supports purchasing twenty-one books per year or initiating two journal subscriptions per faculty member.

[2] Increased permanent base-budget funding for the acquisition of print and electronic books ($90,000 increase over three years).

[3] $80,700 in increased permanent base-budget funding over three years to cover inflation in CDL-licensed electronic resources. (Inflation calculated at 3% due to multi-year agreements that include price caps.) $127,200 in increased permanent base-budget funding over three years to cover inflation in locally-acquired print and electronic resources. . (Inflation calculated at 6% due to the necessity to pay list price)

[4] One-time funding to purchase databases.

Appendix C
Digital Assets Operations Request

Need		Cost P.A.
10 TBs for Long-Term Storage of Digital Assets[1]		$20,000
Faculty Mini Grants [2]		$20,000
Graduate Fellowship [3]		$20,000
Student Employees [4]		$20,000
	Total	$80,000

[1] California Digital Library is now charging campuses for data storage services that were previously available at no cost. As UCM's collection of digital assets grows, additional storage beyond 10 TBs will be required.

[2] Faculty mini grants will incentivize faculty to curate and archive digital research assets or produce digital scholarly communications. While there has been faculty interest in working with the Library on such projects, securing faculty commitment and follow-through without support for their time has been difficult.

[3] A fellowship would provide support for a graduate student to work with the Library Digital Assets team on projects involving digital curation or digital scholarship.

[4] Undergraduate student assistants are the core workforce for digitization and data entry for digital collection building. This additional support is needed to keep pace with rising labor costs and growing collections

Appendix D
New Positions

Position	Area	Level	FY15-16	FY16-17	FY17-18
Library Marketing Coordinator	Research Services	PSS/MPS	$110,000	$110,000	$110,000
Decision Support & Assessment Specialist	Operations	PSS	XXXXX	$95,000	$95,000
Outreach Specialist	Digital Assets	Post Doc	$90,000	$90,000	XXXXX
Metadata Specialist	Digital Assets	Associate Librarian	XXXXX	$110,000	$110,000

All salary amounts include salary, benefits, and S & E.

Budget Summary

Need Area	FY15-16	FY16-17	FY17-18	Notes
Collections	$352,900	$250,400	$263,600	Appendix B
Positions	$200,000	$405,000	$315,000	Appendix D
Digital Assets	$80,000	$80,000	$80,000	Appendix C
Operations	$44,200	$48,620	$53,482	10% increase per year
Total Per Year	$677,100	$784,020	$712,082	
3-Year Total				$2,173,202

Charge: IT Advisory Council (ITAC)

The IT Advisory Council functions as an IT Governance support for UC Merced's Information Technology organization through its advisory role to the Chief Information Officer. In executing its charge the Council informs the CIO's decision-making, budget management and staff resourcing, to meet campus-wide IT academic and administrative priorities and to advance UC Merced's IT capacity to support learning and research. The Council meets at a minimum once a month for 60 – 90 minutes.

Specifically, the Council is charged to

1. Facilitate the alignment of IT to UCM priorities by
    a. Fostering the adoption and dissemination of standard processes and criteria for developing, submitting, reviewing, prioritizing and acting on proposed IT initiatives;
    b. Recommending resolution to issues or conflicts that, if unresolved, would jeopardize the successful completion of approved IT initiatives.

2. Advise the CIO on strategic goals, tactical objectives and institutional policies in the following areas as they relate to UCM information technologies:
    a. Security and identity management
    b. Funding models, including resource planning
    c. Strategic technology plans for academic needs
    d. Research Computing
    e. Disaster recovery planning
    f. University-wide technology systems that support university business and communication needs

3. Review and recommend IT policy development and dissemination,

4. Review and understand the financial context for IT, forwarding recommendations or statements of support for project funding levels to relevant and appropriate decision-makers when necessary in an effort to optimize investments in technology.

5. Work with the CIO to communicate the status of IT initiatives to the University community.

6. On an as needed basis, assist the CIO in forming established task forces or ad hoc reviews to deal with pressing, immediate issues such as:
    a. Protecting e-data from unauthorized access and disclosure.
    b. Developing a plan to recover critical business services if a major IT disruption occurs.
    c. Advising and prioritizing Internal Audit actions
    d. Advising on solution reviews such as RFPs or new systems acquisitions for enterprise, campus-wide needs.

Membership Roster

NAME	ASSISTANT
Greg Camfield, Vice Provost for Faculty, gcamfield@ucmerced.edu	Victoria Keaton vkeaton@ucmerced.edu
Samuel Traina, Vice Chancellor for Research <straina@ucmerced.edu	Peggy Collins <pcollins3@ucmerced.edu>
Elizabeth Whitt, Vice Provost/Dean for Undergraduate Education <ewhitt@ucmerced.edu	Rachel Seymour <rseymour3@ucmerced.edu
Erik Rolland, Professor, School of Engineering, Interim Dean<erolland@ucmerced.edu	Hannah Ewing <hewing@ucmerced.edu
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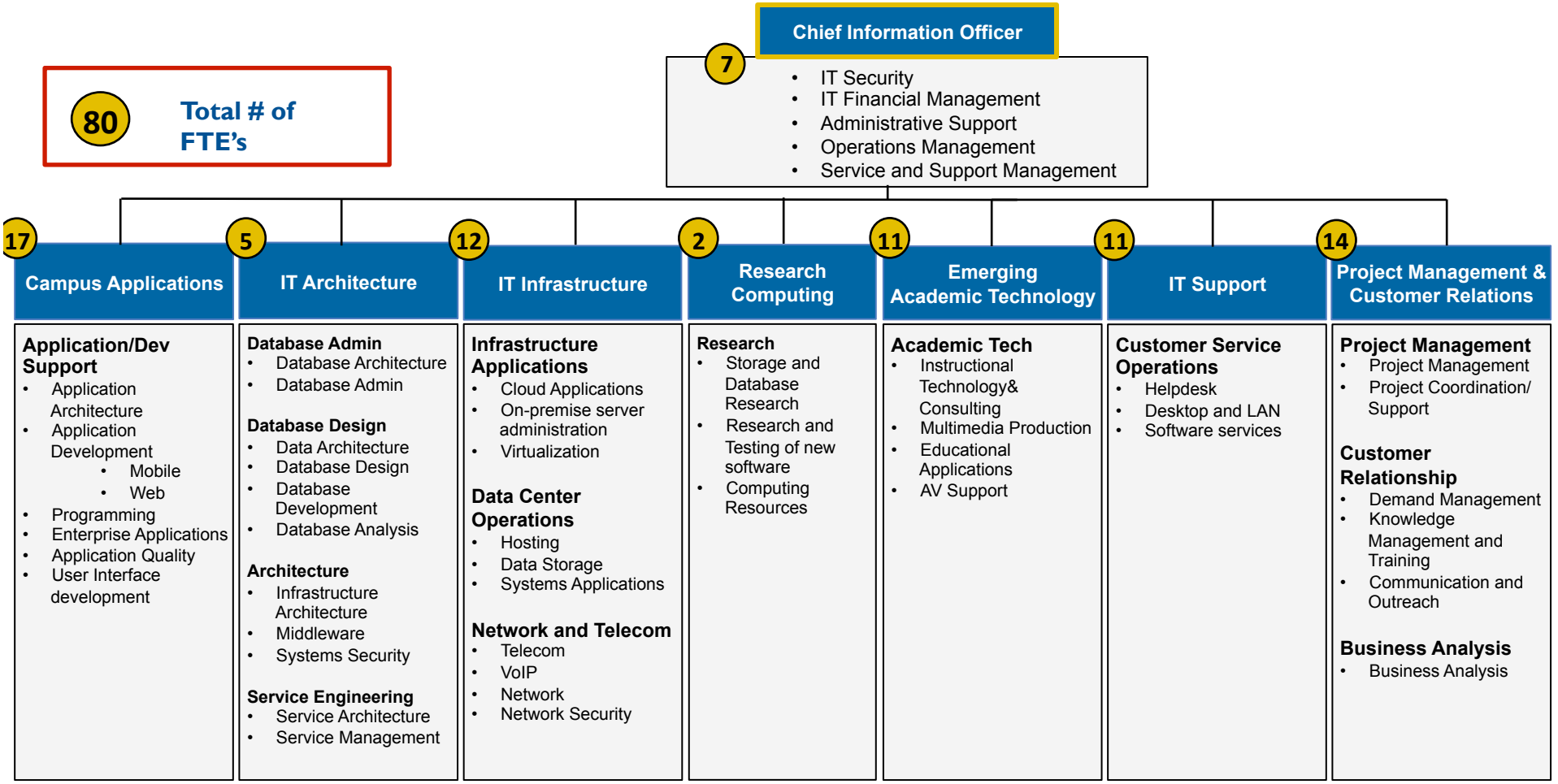
Veronica Mendez, Assistant Vice Chancellor <vmendez7@ucmerced.edu	
Haipang Li, University Dean of Libraries < hli58@ucmerced.edu	Stacy Dabney < sdabney@ucmerced.edu
Jill Orcutt, AVC for Enrollment Management,< jorcutt2@ucmerced.edu	Susan Pierce < spierce2@ucmerced.edu

Functional IT Organization Structure

Based on discussion with UCM leadership and the assessment of IT needs at UCM, a service based organization with alignment according to IT services is the best fit in the future state organization structure.



	Job Title: Info Sys Anl 4 Job Code:0499 Employee: VACANT
Employee Name	VACANT
PCN (Position Control Number)	
Organization	EXECUTIVE VICE CHANCELLOR
Division	INFORMATION TECHNOLOGY SERVICES
Department	INFORMATION TECHNOLOGY SERVICES
Job Family	Information Technology
Job Function	Information Systems
Job Category	Professional
Job Function Description	Involves providing a variety of IT services. Assignments may include database administration, application programming, IT project management, systems administration, systems and process analysis, security, solution development and maintenance, business technical support or a combination of these and/or other IT functions. Note: If 50% or more of the position is in a defined sub-family, the position should be placed in that sub-family.
Job Title	Info Sys Anl 4
Job Code	0499
Personnel Program	MSP
Salary Grade	25
FLSA	Exempt
Job Level	Advanced
Generic Scope	Technical leader with a high degree of knowledge in the overall field and recognized expertise in specific areas; problem-solving frequently requires analysis of unique issues/problems without precedent and/or structure. May manage programs that include formulating strategies and administering policies, processes, and resources; functions with a high degree of autonomy.

	Job Title: Info Sys Anl 4 Job Code:0499 Employee: VACANT		
Custom Scope	Responsible for all aspects of the University of California- Merced Emerging & Academic Technology vision. The Director will work with senior executives, deans, faculty, IT colleagues and other academic staff to develop and drive strategy for innovative teaching and learning which undergird the priorities of the university – research, educational excellence, and student success. The Director will support and work closely with faculty and all stakeholders to ensure that pioneering programs meet the university's standards for high quality and lead the campus in the planning, design, and implementation of technology to support teaching, learning, and digital scholarship. Provides leadership in the design of a roadmap for emerging technologies that impact teaching, learning and research. Facilitates the adoption and utilization of technology-rich teaching and learning services, resources and facilities through collaborative curricular innovation, including methods for delivering courses, technology enhancements to improve current academic instruction and support of academic technologies currently provided as services. Design and support the use of spaces for teaching, learning and active collaboration and insure scalable and sustainable solutions across broad spectrum of academic technology functions		
Key Responsibilites	30%	The Director of Emerging & Academic Technology advises and supports the Deputy Chief Information Officer (DCIO) of Services and Project Management regarding strategic planning for the development of campus policies and procedures related to the use of technology in education. Responsible for aligning the academic technology strategy, technology decisions and services with institutional priorities of UC Merced. Partners with academic leadership to develop a coordinated technology program and services for students and faculty. Works collaboratively and effectively with faculty throughout the University to provide pedagogical and technical consulting to design, develop, and implement instructional content, courses and projects that enrich teaching and learning through the use of technology in online, hybrid and traditional courses, including the integration of student learning outcomes	Yes
	30%	Directs the delivery of campus technology support services related to classrooms and labs and media support services. Oversees planning and budgeting needs and staff development programs for the Academic & Emerging Technology team to ensure the delivery of high quality services to the community. These efforts include collaboration in the design of learning spaces. Demonstrates supplemental pedagogical opportunities provided by the use of technology, and encourages faculty to deliver instruction and content in new ways based on emerging trends in higher education course delivery. .	Yes
	20%	Builds, directs and manages the day to day operations of the IT teams of the University of California – Merced including Multimedia/ Digital Media Production, LMS administration, Instructional Design Consulting and Lab & Classroom AV Support. Establishes work priorities of subordinates, practices and procedures involving technical standards, personnel requirements and general administrative aspects of the team's data and business systems.	Yes

	Job Title: Info Sys Anl 4 Job Code:0499 Employee: VACANT		
	20% Maintains expertise in new and emerging instructional technologies as well as teaching and learning issues in higher education. Promotes the development and awareness of innovative technologies and technology services for the advancement of teaching, learning and research through leveraging technology. Engages the academic community in the exploration, discussion, and assessment of educational technology and works collaboratively across the University to leverage and expand existing efforts into an intentional program of faculty support.		Yes
	100 % Total.		
	Note: The responsibility is essential if it is marked 'Yes'.		
Education	Master's degree in related area and/or equivalent experience/training.		Required
	Ph. D		Preferred
	Experience teaching in a post-secondary environment or an online environment		Required
License Certifications	Licenses	Certifications	Conditions
	N/A	N/A	N/A
	N/A	N/A	N/A
	N/A	N/A	N/A
Knowledge Skills	At least 5 years of experience working with emerging and academic technologies		Required
	Superior understanding of educational programs and processes, teaching practices, the application of technology in teaching and learning; and trends and best practices in higher education technology applications and usage.		Required
	Ability to think, plan, and act strategically. A strong record of innovation leading to organizational change, and a broad understanding of emerging trends in information technology and their likely impact on higher education in the pursuit of academic transformation.		Required
	Strong leadership, creative-problem solving skills, strategic planning, and communication skills are required		Required
	Proven success in building and managing academic IT services at a large, complex learning environment and familiarity with virtual (online) and blended learning environments		Required
	Experience with standard Internet programming environments and the ability to work closely with vendors to prototype new applications and system environments.		Required

	Job Title: Info Sys Anl 4 Job Code:0499 Employee: VACANT	
	Expert-level technical development skills and complex problem solving centered around new and emerging technologies that require innovative, collaborative effort to research and develop potential solutions	Required
	Technical ability to work with C, C#, Java, HTML/XML, JavaScript, Perl, PHP/MySQL (preferred). System administration with Windows, OS X, Linux, Apache, MySQL, and cloud computing. At a minimum being able to support concrete conversations with more technical staff who are versed in these technologies.	Required
	Expertise with a variety of LMS and specifically implementation and integration of LMS-s with a focus on features and how they talk to each other (example Banner to Blackboard to Third party content and back to gradebook(s))	Required
	Ability to effectively influence others to achieve understanding, acceptance and commitment to act in support of ideas. Actively promotes and solicits support for initiatives. Builds credibility as a leader by demonstrating personal commitment and sharing information. Utilizes an understanding of audience perspectives and interests, successfully selecting	Required
Environment	Campus	
Career Job Path	Information Systems Anl 5^Information Technology / Information Systems / Supervisory and Management	
Physical Requirements	Bend	Frequently
	Sit	Frequently
	Squat	Frequently
	Stand	Frequently
	Crawl	Frequently
	Walk	Frequently
	Climb	Frequently
	Push/Pull	Frequently
	Kneel	Frequently
	Handle	Frequently
	Reach	Frequently
	Fine Movements	Frequently
	Other	

	Job Title: Info Sys Anl 4	Job Code:0499	Employee: VACANT	
	Light(up to 25lbs.)	Frequently		
	Moderate(25lbs to 50lbs.)	Occasionally		
	Heavy(over 50lbs.)	Occasionally		
Mental Requirements	Read/Comprehend	Frequently		
	Write	Frequently		
	Perform Calculations	Frequently		
	Communicate Orally	Frequently		
	Reason and Analyze	Frequently		
	Other			
Environmental Requirements	Is exposed to excessive noise		Occasionally	
	Is around moving machinery		Occasionally	
	Is exposed to marked changes in temperature and/or humidity		Occasionally	
	Drives motorized equipment		Occasionally	
	Works in confined quarters		Occasionally	
	Other			
	Dust		Occasionally	
	Fumes		Occasionally	
	Gases		Occasionally	
	Radiation		Occasionally	
	Microwave		Occasionally	
	Other			
Direct Supervision	COMPUTER RESOURCE SPEC. I		3	
	AV IT SPECIALIST 3		3	
	Info Sys Anl 4		4	
Supervision Received	Select Supervision Level	General Direction		
Critical Position	Masterkey access to residence and other facilities?			Yes
	Extensive authority for committing the financial resources of the University?			Yes
	Direct access to or responsibility for cash , cash equivalents, checks or University property disbursements or receipts?			N/A

	Job Title: Info Sys Anl 4 Job Code:0499 Employee: VACANT	
	Responsibility for operating commercial vehicles, machinery or toxic systems that could cause accidental death, injury or health problems?	N/A
	A requirement for a professional license, certificate or degree, the absence of which would expose the University to legal liability and/or adverse public reaction?	N/A
	Direct access to and/or responsibility for protected , personal or other sensitive data?	N/A
	Position requires adherence to CANRA guidelines and is a Mandated Reporter?	N/A
	Position requires annual filing of State of Economic Interests (Form 700)?	Yes
	Note: This is a critical position if any are marked 'Yes'.	
Date Created	7/17/2015 11:28:52 AM	
Last Edited	7/20/2015 10:36:52 AM	
Supervisor Name	Kovalchick, Ann (akovalchick)	
Department Head	Kovalchick, Ann (akovalchick)	

Signatures:

Employee X_____ Date_____

VACANT

Supervisor X_____ Date_____

Kovalchick, Ann

Department Head X_____ Date_____

Kovalchick, Ann

Effective Date	ER Code	Approved title/Grade	Analyst Initials	Date Classified	Title Code / Job Number

Human Resource X_____ Date_____

	Job Title: Sys Adm 5 Job Code:0521 Employee: VACANT
Employee Name	VACANT
PCN (Position Control Number)	
Organization	EXECUTIVE VICE CHANCELLOR
Division	INFORMATION TECHNOLOGY SERVICES
Department	INFORMATION TECHNOLOGY SERVICES
Job Family	Information Technology
Job Function	Sys and Infrastructure Admin
Job Category	Professional
Job Function Description	Involves serving as the technical administrator for hardware, operating systems, and network management. Plans and coordinates the installation, configuration and testing of hardware and software components. Work may involve central or departmental computer systems and networks. Includes web systems administration.
Job Title	Sys Adm 5
Job Code	0521
Personnel Program	MSP
Salary Grade	26
FLSA	Exempt
Job Level	Expert
Generic Scope	Recognized organization-wide expert. Has significant impact and influence on organizational policy and program development. Regularly leads projects of critical importance to the organization; these projects carry substantial consequences of success or failure. May direct programs with organization-wide impact that include formulating strategies and administering policies, processes, and resources. Significant barriers to entry exist at this level.

	Job Title: Sys Adm 5 Job Code:0521 Employee: VACANT		
Custom Scope	The Director of CyberInfrastructure & Research Computing will help identify, engage and support the needs of faculty, postdoctoral researchers and graduate students to insure projects related to their research are successful. Through participatory and collaborative decision-making with the Faculty Committee on Research Computing, s/he is responsible for managing the design, development, and delivery of a cost-effective mix of services that support research computing, including shared high-performance computing resources, data-analysis platforms, storage systems, and visualization tools and platforms across the UCM campus. The incumbent will be expected to work closely with the Academic Deans, the Vice Chancellor for Research and the OIT leadership team to finding opportunities across UCM to increase services to support research that will span across virtually every academic discipline with important applications in fields such as mathematics, science and engineering, genomics, meteorology, remote sensing, molecular modeling, and artificial intelligence. In general, this work will include providing expertise, developing tools and techniques in scientific visualization, efficient parallelization of applications, data formats and I/O methods, grid computing, programming frameworks, optimization, and algorithms. He or she will will manage the day-to-day operations and provide oversight, direction, mentoring, coaching, and professional development to a cross-functional team of research computing systems professionals, and will assist with systems administration tasks as necessary and appropriate. The incumbent will also be responsible for improving the efficiency of codes written by UCM researchers, supporting grant proposals and funded grants, as well as providing educational workshops and training for the UCM community.		
Key Responsibilites	40%	Work closely with researchers, research units and schools across UCM to identify research-computing needs and ensure that they are being met in the most cost effective manner. Work with supercomputer users to develop their own research computing software or help them deploy and use third party software (commercial and/or open source). Direct and manage technical personnel responsible for providing quality service and support for the campus' research computing activities. Develop and report metrics that measure workload and performance of systems and services	Yes
	40%	Engage in strategic planning, tactical design, and operational management of infrastructure and applications. Maintain a robust infrastructure for research computing and data stewardship. Specifies, writes and executes software and scripts, up to and including the most complex, that may involve systems or services of enterprise level scope.	Yes
	10%	Teach research computing topics to individuals, small and/or large groups. Develop and/or collaborate on research projects and/or grant proposals that further the UCM CyberInfrastructure vision and strategy.	Yes
	10%	Work with academic leadership to help identify business strategy, requirements, trends, and desired business outcomes for Research Computing. Stay abreast of trends and new advances in the high performance computing industry by reading, researching, and participating in forums or communities of HPC professionals. Establish, maintain, and/or participate in research computing consortia locally, regionally, and nationally. Establish effective relationships with relevant external research computing organizations and ensure that UCM is effectively utilizing national research infrastructure	Yes

	Job Title: Sys Adm 5 Job Code:0521 Employee: VACANT		
	100 % Total. Note: The responsibility is essential if it is marked 'Yes'.		
Education	Master's degree in any STEM discipline, including but not limited to physical sciences, biosciences, geosciences, mathematics, computer science, engineering and/or social sciences.		Required
	2+ years of software programming experience; Ph.D. in a related field will substitute for three years of experience.		Required
License Certifications	Licenses	Certifications	Conditions
	N/A	N/A	N/A
	N/A	N/A	N/A
	N/A	N/A	N/A
Knowledge Skills	Knowledge and experience of one or more of the following (and be prepared and able to develop skills in other areas): 1.Parallel programming (primarily with MPI); 2.Grid computing, programming frameworks; 3.Numerical methods and algorithms; 4. Software debugging, profiling and optimization in an HPC environment; 5.Scientific visualization; 6. Experience with a variety of HPC applications.		Required
	In-depth understanding of research cyberinfrastructure landscape and demonstrated experience with processes for procurement, deployment, and operation		Required
	Strong data analysis skills and ability to identify process problems and correct them through policy, procedures and software checking.		Required
	Strong program-development skills in order to develop innovative services and tools. Ability to analyze and assess needs in research computing administration		Required
	An established record of accomplishments demonstrated by engagement with researchers and users as well as extensive experience with managing, operating and delivering research cyberinfrastructure services.		Required
	Demonstrated knowledge of how to implement and manage the operational aspects of a Research Computing Infrastructure, including the development of standards and expectations		Required
	Demonstrated experience supporting computational science and engineering or as a user with experience with computational science and engineering applications		Required

	Job Title: Sys Adm 5 Job Code:0521 Employee: VACANT	
	Demonstrated expertise in specifying, designing and implementing computing infrastructure, clustered and parallel file systems, large scale storage, backup and archiving, and high-bandwidth networking, software defined networks and Science DMZ	Required
	Background and familiarity with cluster management, batch-job schedulers, and workflow-management tools.	Required
	Highly developed written, oral, listening and presentation skills	Required
	Excellent customer service skills as demonstrated by the ability to work directly with constituents and vendors to understand and resolve function and/or technical issues to deliver an exceptional customer experience.	Required
	Must be able to lead complex discussions by seeking input, identifying obstacles, being transparent, and driving to results.	Required
Environment	Campus, medical center or other university setting and various external venues.	
Career Job Path	Systems Administration Supv 2	
Physical Requirements	Bend	Frequently
	Sit	Frequently
	Squat	Frequently
	Stand	Frequently
	Crawl	Occasionally
	Walk	Frequently
	Climb	Frequently
	Push/Pull	Frequently
	Kneel	Frequently
	Handle	Frequently
	Reach	Frequently
	Fine Movements	Frequently
	Other	
	Light(up to 25lbs.)	Frequently
	Moderate(25lbs to 50lbs.)	Occasionally
	Heavy(over 50lbs.)	Occasionally

	Job Title: Sys Adm 5 Job Code:0521 Employee: VACANT		
Mental Requirements	Read/Comprehend	Frequently	
	Write	Frequently	
	Perform Calculations	Frequently	
	Communicate Orally	Frequently	
	Reason and Analyze	Frequently	
	Other		
Environmental Requirements	Is exposed to excessive noise	Occasionally	
	Is around moving machinery	Occasionally	
	Is exposed to marked changes in temperature and/or humidity	Occasionally	
	Drives motorized equipment	Occasionally	
	Works in confined quarters	Occasionally	
	Other		
	Dust	Occasionally	
	Fumes	Occasionally	
	Gases	Occasionally	
	Radiation	Occasionally	
	Microwave	Occasionally	
	Other		
Supervision Received	Select Supervision Level	General Direction	
Critical Position	Masterkey access to residence and other facilities?		Yes
	Extensive authority for committing the financial resources of the University?		Yes
	Direct access to or responsibility for cash , cash equivalents, checks or University property disbursements or receipts?		No
	Responsibility for operating commercial vehicles, machinery or toxic systems that could cause accidental death, injury or health problems?		No
	A requirement for a professional license, certificate or degree, the absence of which would expose the University to legal liability and/or adverse public reaction?		No
	Direct access to and/or responsibility for protected , personal or other sensitive data?		Yes
	Position requires adherence to CANRA guidelines and is a Mandated Reporter?		N/A

	Job Title: Sys Adm 5 Job Code:0521 Employee: VACANT
	Position requires annual filing of State of Economic Interests (Form 700)? Yes Note: This is a critical position if any are marked 'Yes'.
Date Created	7/28/2015 4:58:21 PM
Last Edited	8/10/2015 3:19:24 PM
Supervisor Name	Kovalchick, Ann (akovalchick)
Department Head	Kovalchick, Ann (akovalchick)

Signatures:

Employee X_____ Date_____
VACANT

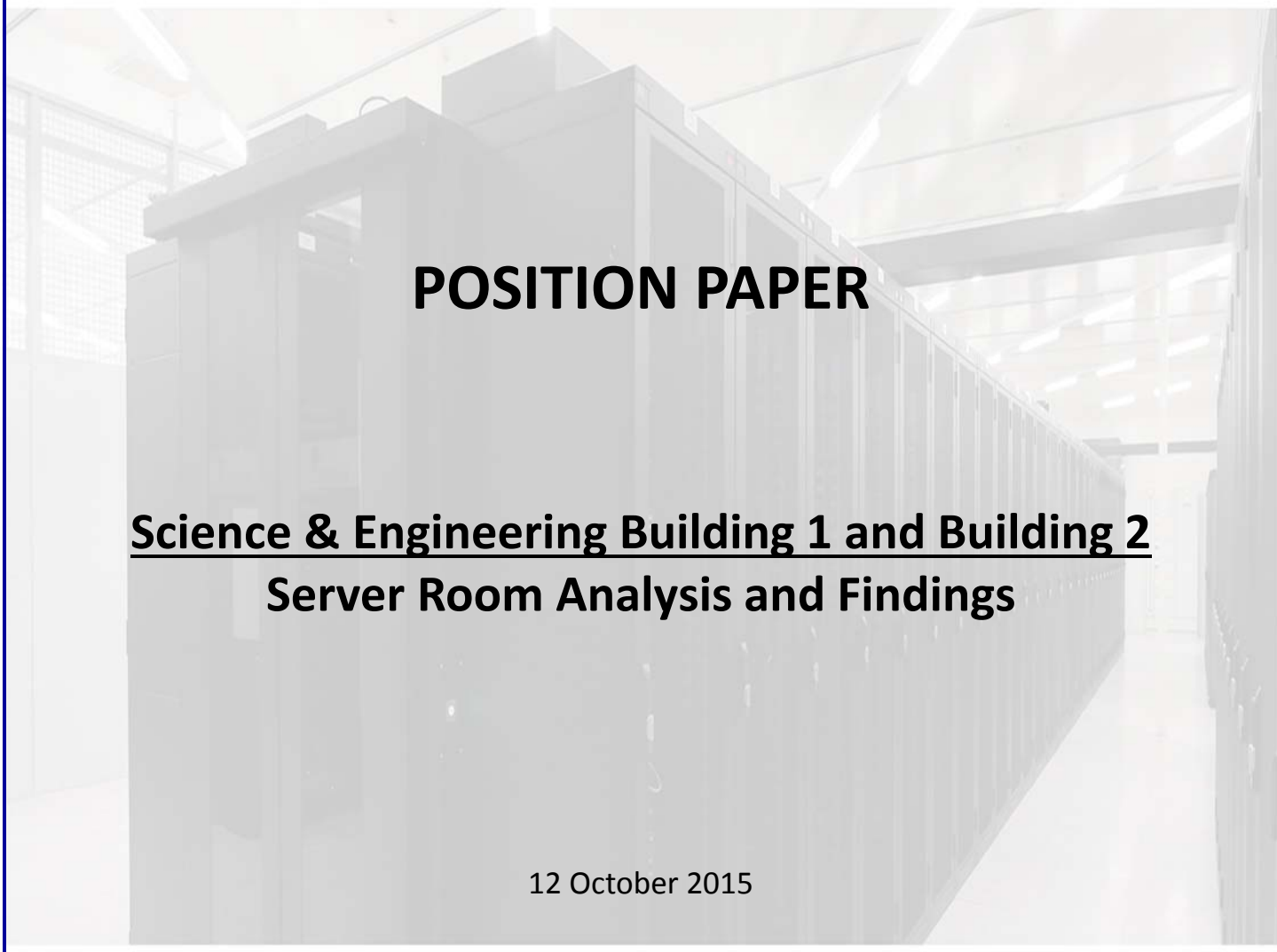
Supervisor X_____ Date_____
Kovalchick, Ann

Department Head X_____ Date_____
Kovalchick, Ann

Effective Date	ER Code	Approved title/Grade	Analyst Initials	Date Classified	Title Code / Job Number

Human Resource X_____ Date_____

UNIVERSITY OF CALIFORNIA
UCMERCED



POSITION PAPER

Science & Engineering Building 1 and Building 2
Server Room Analysis and Findings

12 October 2015

Prepared by:

AECOM

Introduction

The University of California at Merced (UCM) is presently implementing the new Next Generation Network replacing outdated and aging equipment such as routers, switches, and wireless access points with more powerful current and emerging components. This undertaking will substantially increase the accessibility, speed, and reliability of the campus network, improving not only the efficiency and uptime of essential data systems used for research, teaching, and learning, but also the quality of daily network based activities such as campus business and mobile device use.

Concurrently, the Central Plant/Telecommunications Reliability Upgrade project is well underway and provides new server equipment cabinets with in-row cooling units served by an independent, closed-loop cooling system connected to the existing chilled water service with heat exchangers and pumps in the TCOMM facility. As part of the upgrade, the TCOMM cabinet space is being reconfigured/maximized providing more equipment space for networking equipment critical to the UCM campus. Additionally, this project includes expanding the emergency back-up power capable of providing one megawatt of power to support critical campus research and telecom infrastructure.

These two important projects facilitate adding/improving the resiliency of the UCM network and enterprise computing without question. However, outside of these two projects there are additional considerations that must be taken into account that include the computational and research computing needs, particularly in the Science and Engineering Buildings 1&2. These two facilities house independent Server Room spaces that provide rack space for faculty research and departmental networking equipment (servers, etc.) as well as the required mechanical and electrical systems to support this equipment. There is concern regarding whether these two spaces can accommodate the anticipated growth presented by the faculty research needs in terms of available space, power, and cooling. The existing conditions are discussed briefly below pointing out the specific concerns for each of these spaces.

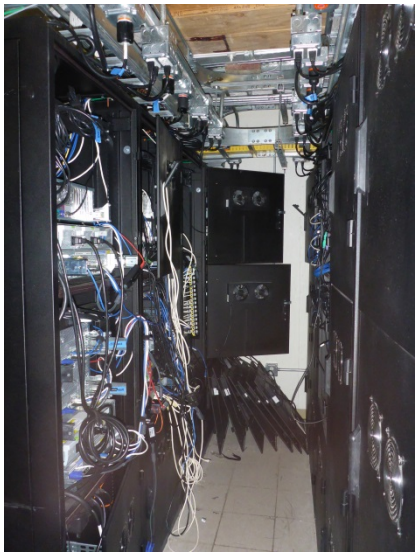
Augmenting the existing spaces with additional power and cooling may be cost prohibitive and disruptive to the day-to-day school operations. Alternatives being considered regarding these two spaces include: 1) Expanding the server capability outside of the space into an exterior containerized solution; or 2) Outsourcing these systems and services to a cloud based solution or collocation facility. A third option, 3) Creating a centralized computing facility (data center) under the purview of Project 2020, is likely not feasible given the current project timeline for the 2020 RFP and budget constraints. These options are explored later in this document. Consideration of remediation as an alternate would require a full cost-benefit analysis

S&E1 - Existing Conditions

A site visit was made to each of these two spaces to obtain a current condition assessment. The findings are presented below.

S&E1 – Server Room

This room is located on the ground floor on the northwest end of the building. This space currently houses 34 cabinets (24"W x 36" D). Three cabinets are relegated to the IT Department, the remaining are mostly assigned to Natural Sciences with limited School of Engineering equipment. Most of the Engineering equipment has been migrated over to the S&E2 server room.



Air conditioning ducts were installed to create a hot aisle/cold aisle cooling solution. There is also a two-tier cable tray installed around the room. There are 120VAC and 208VAC receptacles installed above every cabinet attached to the cable tray. The lighting resides above all these layers creating a less than ideal working environment (standards require 30 foot candles of light when measured 36" above the finished floor).

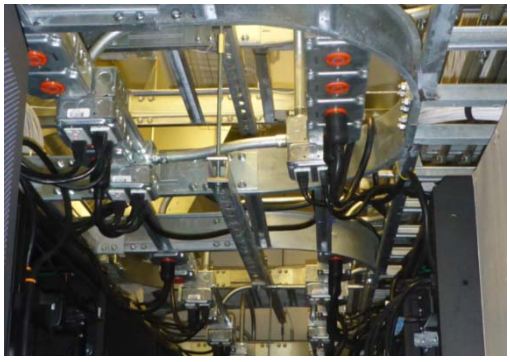
Not all the cabinets are full; in fact there are pockets of space in just about every cabinet. It is estimated that there is ~40% of available cabinet space in S&E1.

S&E1 – Mechanical Systems

The room is equipped with two AC units providing a combined 63.3kW of air conditioning in the room. There are 34 cabinets in the room which equates to 2kW per cabinet. In many cases, cabinets are far exceeding 2kW which creates an imbalance of the system. The current cooling load is estimated to be 25kW.

Another issue is that both AC units are running 100% of the time. Current design methodologies provide a redundant AC unit to facilitate maintenance needs allowing one unit to be shut down while the other two units continue operating. Also, having the 3rd unit allows for the units to alternate switching on/off so that they wear and tear is prolonged across the three units.

S&E1 – Electrical Systems



The room has four load panels each rated at 150A and these are attached to a 130kVA UPS. Current loadings indicate that only 30% of the total available UPS load is being used. There is significant electrical infrastructure installed throughout the room. Both 120VAC and 208VAS is offered at almost every cabinet location. This creates significant congestion in the

aisles and in the overhead space.

S&E1 - Future Considerations

Every room has their limitations in terms of cabinet rack space, power, and cooling. With the push for research computing equipment on the rise and the demand for space in cabinets for this new equipment plus the required power and cooling, the current conditions for S&E1 start to come into play. A recent Natural Sciences installation was performed in S&E2 due to the available power and cooling in the space. That single installation occupied only 1/3 of a cabinet but it maxed out the available power for that cabinet at 10kW. No more installations can occur within that cabinet thus losing 2/3 of available cabinet space.

Looking forward, similar 10kW installations in S&E1 would allow for a maximum of four identical research computing equipment systems and would max out the existing mechanical system; and a total of six identical research computing equipment would max out the existing electrical system.

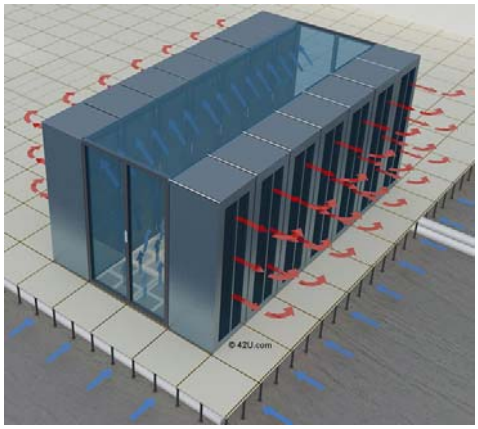
S&E2 – Existing Conditions

S&E2 – Server Room

This room is located on the ground floor on the northwest end of the building. This space currently houses 20 cabinets (30”W x 48” D). Three open relay racks are relegated to the IT Department. One cabinet was assigned to Natural Sciences with the remainder allocated to the School of Engineering equipment. Most of the Engineering equipment has been migrated over to the S&E2 server room from S&E1.

S&E2 – Mechanical System

The room was constructed using a Rittal brand containment solution. In this case, the cold air is “contained” inside and enclosed area (shown to the right) and concentrated in the “cold aisle” such that the server fans draws this cold air through the network device and the heat is generated out the rear of the cabinet. This hot air is then pulled back through an in-row water cooled heat exchanger and cold air is exhausted back into the cold air aisle.



The current capacity of the Rittal containment system is 366kW of capacity (36kW per cabinet) and is actually oversized when compared to the available power. These two systems usually are designed in synch with each other but in this case it was not.

S&E2 – Electrical System

The existing UPS is rated at 300kVA (270 kW) and each cabinet is provisioned for 13.5KW each (x20 cabinets). There are two rows of cabinets = A+B, numbered 1-10. Power loads to date is as follows:

- Cabinets A7+A9 = 100% each
- Cabinets B1-B5 = 70% each (Natural Sciences Equipment)
- Cabinets B6-B10 = 40% each
- Remaining Cabinets = Estimated to be ~60% once all servers are moved over from S&E1

Based on these projected loads, the A Row of cabinets only has ~43.5kW available out of 135kW; the B Row cabinets only have ~60.75kW of power available. Looking forward, additional 10kW installations in S&E2 A Row would allow for a maximum of four identical research computing equipment systems and would max out the existing electrical system; and a total of six identical research computing equipment in B Row would max out the existing electrical system.

Summary Findings

In general, the S&E1 room is long overdue for a technology refresh to include cabinets, power distribution, and more efficient cooling. Moreover, the overall layout and accessibility to ancillary systems including light fixtures, cable tray, and AC units is constrictive and operationally dysfunctional. With the plethora of electronic equipment there is no fire suppression solution such as FM200 installed leaving UCM vulnerable in the case of a fire. Augmenting the room as it is today would be very difficult due to the congested areas above the cabinets.

Ideally, a new room design should be considered to meet today's technology trends and operational considerations to make the room functional, operationally more conducive providing open access to above cabinet systems, and providing a more robust and efficient power and cooling solution, much beyond what it is today. However, making these improvements in a current operational environment would prove to be very challenging with equipment relocations to empty the cabinets prior to removal. This activity would require reconfiguring the network connectivity (down time), re-circuiting the power to balance the loads, and making mechanical system changes. This would require a very detailed plan to be executed at strategic periods (school breaks/holidays/summer). Finding expansion space for the UPS system (essentially doubling the existing supply) may be problematic as well.

Augmenting the current S&E1 space would be potentially much more expensive and impactful to day-to-day operations than perhaps an alternate solution.

The S&E2 room, while much more technology friendly in terms of applied power, cooling, and fire suppression methodologies, is still considered to be undersized from a power perspective, but not from a cooling perspective which is considered oversized.

UCM needs to establish power and cooling thresholds for future monitoring of these two spaces and as these thresholds are met, a move to a different alternative solution should be employed. The alternative options mentioned previously include: 1) Expanding the server capability outside of the space into an exterior containerized solution; or 2) Outsourcing these systems and services to a cloud based solution or collocation facility. A third option, 3) Creating a centralized computing facility (data center) under the purview of Project 2020, is likely not feasible given the current project timeline for the 2020 RFP and budget constraints.

Containerized Solution

The containerized solution is described as a preconfigured mobile "container" equipped with integrated power (UPS and house power), cooling, and rack space can be placed on the exterior of the building and connected to a new, dedicated umbilical interface (power source, network backbone interface, non-potable water). The container can be preconfigured in most any variety and is available from multiple vendors for competitive pricing. There would be no impact to the existing space such as creating construction zones in the building, accommodating UPS expansion (blowing out walls, new electrical, cooling, lighting, etc.). In order to understand this containerized solution, a video produced by Microsoft describes the high level demonstration of a containerized solution and can be found at https://www.youtube.com/watch?v=S3jd3qrhh8U. Similar solutions are in use for other providers such as Google, Yahoo, etc.

New Data Center Facility

The second alternative for consideration is constructing a new data center facility as part of the Project 2020 or as a separate initiative. A dedicated facility that will provide robust server capability including extensive house power, emergency power (N+ 1 generator), cooling using similar containment systems, Network Operations Center (NOC), IT administrative staff, material storage areas, and equipment/software burn-in rooms. The existing TCOMM facility, while robust, is generally small in size with limited growth capabilities and does not truly provide all the functions and spaces mentioned previously. This is an opportunity to construct a new facility that will take UCM well

into the future should this option be exercised. The investment for making the proposed improvements to S&E1 and 2 may be better spent towards a new facility.

Cloud Computing/Collocation Considerations

UCM has previously stated that a preferred route of mitigation might be to consider moving to more of a cloud based solution or perhaps a collocation option thus outsourcing the equipment/software as opposed to constructing a mission critical facility, or purchasing, installing, and maintaining departmental servers/software.

The alternatives should be further investigated in a business case evaluation with cost/benefit figures being derived. Continuing to pay the expense of maintaining server rooms, data centers, file servers, etc. including recurring power and cooling costs, plus the administrative and technical resources, may prove to be more expensive in the long haul versus relegating a percentage of those costs in an outsource model.

UCM IT has already adopted a Cloud First strategy for enterprise computing. Adopting a similar model for research computing would require engaged faculty oversight and explicit buy-in from academic leadership to support and enable this approach. Policy and practices defining requirements for when an on-premise architecture is needed must be specific to identify hard limited to current power and cooling availability. As well, grant funding cost structures would change as well since cloud service costs are subject to indirect cost burden. At present researchers do not bear the cost of on-premises space to house their computers, power to run them, or equipment to cool them.

UNIVERSITY OF CALIFORNIA MERCED REPORT

Charlie McMahon (Tulane) and Edward Seidel (NCSA, U of Illinois)

In March 2015, the University of California Merced (Merced) welcomed Charlie McMahon (VP of IT, Tulane University) and Ed Seidel (Director, National Center for Supercomputing Applications). Provost and Executive Vice Chancellor Tom Peterson, Associate Vice Chancellor of Information Technology Ann Kovalchick, and Vice Chancellor for Research Samuel Traina asked McMahon and Seidel to review Merced's cyberinfrastructure and offer recommendations aimed at developing enhanced research cyberinfrastructure.

While at Merced, McMahon and Seidel toured the facilities and met with representatives from various stakeholder groups including graduate students, faculty, and senior leadership. Additionally, Seidel met numerous representatives from key computing centers, including the Director of San Diego Supercomputer Center (SDSC) Mike Norman and the Associate Director of SDSC Nancy Wilkins-Diehr. Also informing their opinion are the May 2010 report "A Research Cyberinfrastructure Strategy for the CIC: Advice to the Provosts from the Chief Information Officers" and the 2014 report "The Case for High Performance Computing at the University of Houston."

Findings

After touring Merced's campus cyberinfrastructure and meeting with representatives from key stakeholder groups, we noted the following points concerning Merced's facilities and hardware, students, faculty, and senior leadership.

Facilities and Hardware

We toured Merced's facilities including two small datacenters. One of these new datacenters is partially populated while the other is not populated making it suitable for a cluster. These datacenters appeared to be designed to accommodate traditional enterprise application workloads. Because of this, the high-energy densities and high-cooling requirements of a high-performance computing cluster will stretch the available power and cooling of these facilities to their limits.

Students

We met with more than 25 graduate students who would be potential users of high-performance computational resources. The students represented diverse disciplines, interests, talents, and needs for advanced computing resources. Among those disciplines not represented at this meeting was physics, a community that has great uses and promise for computational resources. Due to these notable absences, it is reasonable to estimate that up to three times that many students would benefit from a robust HPC environment, an estimate that was informally verified in discussions with the group.

Students see access to computing facilities and support at Merced as a limiting factor to their research, constraining the size and types of scientific questions they can pursue. For example, students' require computational resources that can accommodate Gaussian analysis, computational fluid dynamics analysis, and structured and unstructured big data analysis. Additionally, students communicated a need for support and training so they can effectively use high-performance computing as part of their research endeavors. Further, access to a strong computational community at Merced as well as the larger high-performance community is key

for support and collaboration. Merced students have learned to be creative and resourceful to satisfy their computational needs through nontraditional means; for instance, one student runs jobs at Purdue while another student is fixing up an old machine to do computation. Overall, students expressed interest in participating in developing cyberinfrastructure and organizing broader computational science activities at Merced. We think this is an important activity to support (see the recommendation section below).

Faculty

During its establishment, Merced envisioned faculty as a key stakeholder group that will participate in the university's cyberinfrastructure environment development. To date, Merced has not realized this vision. Instead, an early pioneering "each person for themselves" environment unfolded, leading to fragmentation and incoherence in the development of computing environments, ultimately resulting in increased costs and higher barriers to collaboration. The faculty, who generally tend to prefer independence and do not easily trust central administration efforts, agreed that this was a problem.

We note that as a newly established university with an interdisciplinary philosophy, a thoughtfully designed collaborative computing and data infrastructure could specifically be used to enhance the ability of faculty, postdocs, students and research staff work together from across campus units. This is especially true in an era where it is possible to use data sharing services as a central integrating factor for research data from instruments, computations, and experiments alike, enabling different groups with different approaches to work more effectively together on complex problems. We urge groups to consider such an approach going forward. Activities such as the Research Data Alliance and the National Data Service are developing such approaches and could be engaged (see Recommendations section).

While at Merced, we met with approximately 30 faculty members, representing fields such as chemistry, mathematics, cognitive science, and linguistics. The faculty offers terrific vision and enthusiasm to build new, interdisciplinary programs at this young university. The faculty described computational workloads that require machines with varied characteristics to satisfy an array of properties, including embarrassingly parallel jobs, communication bound jobs, jobs that require big data analytics utility, and some jobs requiring large shared memory machines. These varied high-performance computing needs require access to different high-performance computing architectures.

Faculty are willing and eager to engage with administration to find a solution to these high-performance computing needs, yet as one faculty member pointed out, "all they have to offer is their time" as they did with the successful faculty sponsored National Science Foundation Major Research Instrumentation grant (MRI). The approximately $615,000 will fund the shared high-performance computing cluster Multi-Environment Research Computer for Exploration and Discovery, code-named MERCED. The high-performance computing cluster will be composed of 36 Intel compute nodes with 20 CPU cores per node. Twenty-four of these nodes will have a 1TB SATA disk while twelve of these nodes will have a 1TB SSD disk. These nodes will utilize 256 GB of RAM. MERCED also includes nine GPU nodes also with 20 CPU cores per node. Two NVIDIA Tesla K20 Single GPU accelerator with 2496 CUDA cores each, totaling 4992 CUDA cores. Five of these nodes have a 1TB SATA Disk; four nodes have a 1TB SSD disk. These nodes utilize 256 GB of RAM. MERCED has one head node and a 36-port Infiniband

switch. With 96TB of general storage and 48TB of storage on the head node MERCED boasts 144TB total storage capacity.

MERCED is a general-purpose machine that is well suited for a broad array of computational workloads. While a good start, it should be noted that MERCED's architecture is not optimized for big data analytics or large shared memory jobs and that its relatively modest size and limited storage will limit its usefulness for large, complex problems. The facilities have the capacity and potential for continued development. At present, Merced is missing the staff commensurate with hardware resources.

Senior Leadership

We also met with both senior administration leadership, including the Provost, Deans, and/or Associate Deans of Natural Sciences (Juan Meza), Engineering (Erik Rolland), Social Sciences, Humanities, and Arts (Mike Spivey), Undergraduate Education (Elizabeth Whitt), Graduate Education (Marjorie Zatz), and later with senior IT and Networking (including Nick Dugan, Dean Lawson, Brian Court, Chip Smith, Jim Brugger, Zuhair Mased, and Mark Lutz). We heard from all involved a deep understanding of how important the development of a more comprehensive computing environment is the success of the university, a commitment to do what is needed, and to work with the faculty to create a shared governance model to achieve common goals.

Other Observations

In general, the faculty and student interviews suggest that Merced needs a culture change aimed at more faculty engagement and more action driven by faculty needs. These changes will be key for both faculty retention and faculty recruitment. The faculty needs include high-performance computing support through strong system administrators and computational scientists. We provide specific recommendations below.

Recommendations for Establishing Balanced High-Performance Computing Infrastructure

Excellent high-performance computing infrastructure relies on combining well-structured hardware with skilled support personnel and the right amenities and software for the user needs. To create an effective high-performance computing environment, the budget should maintain a 40-40-20 balance, committing 40 percent of the budget funds to hardware, 40 percent to support personnel, and 20 percent to other needs including training, travel, and software. This assumes that adequate data center facilities and robust networks exist and that power costs are paid through separate funding sources. It is important to note that the data center facilities at Merced do not appear to be adequate for a major material expansion of MERCED (although a small expansion may be needed if MERCED is to serve campus beyond its intended NSF deliverables). Until such time when additional data center facilities are available, we recommend a strategy that invests more heavily in people, networking, and storage with a relatively smaller investment in computational hardware than would normally be seen in an HPC operation.

To facilitate meaningful computational research, Merced should consider the following recommendations:

Local Governance Structures

- We recommend creating a new faculty advisory committee of key members willing to take leadership and work with CIO, Dean, and VCR to guide development of an

enhanced computing environment. Discussions with faculty indicate eagerness to participate. This group would consider these recommendations, and of course would generate their own!

- We suggest creating a graduate student organizational group to give students a voice and build the community and interconnections across the campus. This group should have a small budget for events and perhaps report to the faculty advisory committee.
- Given the importance of data services, and the role that libraries now play in these developments, we recommend that the Merced library engage in governance structures (assuming they have interest and capacity to engage).

Computing Environment

- Building on the success of the NSF MRI award, Merced should use the small high-performance computer MERCED to nucleate a broader activity for the campus. We recommend that Merced senior leadership begin by congratulating the faculty on this award and offering to invest in additional staff to run and support it for the broader campus community.
    - This must include at least one high-level system administrator and at least two PhD-level computational scientists to support the computing environment, its users, and advanced application development. Because this is relatively modest staffing, cross training of system administrators and computational scientists will be crucial. Please see Appendix B in "The Case for High Performance Computing at the University of Houston" for guidance on position salaries. Senior leadership may adjust salaries relative to the local market.
    - Consider creating several graduate student Research Assistant positions to work with this team to augment these activities and to involve compute-capable students. Research Assistant can support existing students and work to attract new computationally minded students to the campus.
    - These staff members and graduate students will collaborate with campus research groups to enhance competitiveness for NSF, NIH, DOE, and other funding opportunities. If done well, grants will likely support and grow this organization over time. We also suggest development of a business model that incentives faculty to partner with this team in writing grant proposals to further build this activity. Merced leadership should arrange a consultation with Jarek Nabrzyski to understand Notre Dame's very successful model.
    - This group will form the nucleus for a small institute for computational and data-enabled science that could grow over time. Consider a model for how this might operate with a faculty member as a leader.
- In addition to the support personnel, we recommend that Merced endeavor to augment the MERCED MRI hardware environment with additional capacity so that it may be used for the broader campus community in several ways:
    - Augment the local storage capabilities as a foundation for campus data services, starting with one petabyte of storage, expandable to multiple petabytes.
    - Consider investments from the Provost's office to expand the capacity of the MRI machine, within limits of the available machine room capability, as needed by the computational groups.

- If the personnel are able to support it, the campus should consider making a small investment in experimental development environments around advanced GPU and CPU systems. Small teams of CS, math, science, and engineering disciplines could have small development projects, possibly associated with specific courses. This could be integral to a small institute as described above. It is very possible that companies would donate such equipment or offer steep discounts.
- To facilitate researchers' direct interaction with external organizations (e.g., LBNL, SDSC, XSEDE, etc.), Merced must construct a high speed science network, or DMZ, that provides end-to-end high-speed connections of at least 10Gbps directly from researchers computers and equipment to XSEDE infrastructure and at least 40Gbps (up to 100Gbps) to the Corporation for Education Network Initiatives in California (CENIC).
- To complement the high speeds of a DMZ, Merced should create a data transfer node on MERCED.
- We believe the role of data and development of data services is critical for the future of the research and education endeavor, and especially interdisciplinary environments such as Merced. We therefore recommend that Merced investigate what other campuses are doing in developing local research data services and connect them to this environment in partnership with the library.

Establish long-term partnerships with external organizations

- Merced should become an active participant in the high-performance computing community. It is important that Merced establish relationships with other computing centers (e.g., SDSC, NCSA) and laboratories (e.g., LBNL) so there is a clear path for faculty who need additional resources. Such centers would like be happy to host key faculty for visits to explore longer-term collaborations with Merced.
- Merced should also develop a campus champion for the XSEDE project, and work directly with Nancy Wilkins-Diehr from the SDSC to create relevant "science gateways" to support specific disciplinary services and collaborations.
- Given the growing importance of data services, we recommend that the campus find representatives to join activities with organizations such as the Research Data Alliance and the National Data Service; representatives will incorporate lessons learned into Merced governance structures.
- Consider establishing formal relationships with PUIs to build a stronger critical mass of faculty and students.
- Once initial steps above are taken, consider creating an external advisory group to meet once per year with the emergent groups to help.

These steps will create the architecture and support channels necessary for Merced's researchers to pursue meaningful computational driven research.

UC VCR-CIO 2015 Summit

Anchor Principles and Key Conclusions

Version 12
September 22, 2015

Background

The modern research enterprise continues to evolve dramatically: Science and digital scholarship are becoming data-driven, research now occurs in increasingly collaborative environments, researchers must be both domain and data experts, and data as a language enabling research and scholarship is the new normal.

This new environment is driving change and presents new challenges and opportunities, from ethics to data access to human analytical capacity. Clearly, this evolving environment requires the University of California to consider and plan for its collective future, and a thoughtful research cyberinfrastructure strategy is required to ensure UC addresses these challenges and that every opportunity is leveraged.

The costs of not addressing this collective UC need are significant*.* The grand, complex challenges facing humankind can only be resolved with robust, coordinated, and collaboratively utilized cyberinfrastructures and related services and support.

VCR and CIO Cyberinfrastructure Conference – March 2015 at UCLA

On March 23, 2015, UC's Vice Chancellors of Research (VCRs) and Chief Information Officers (CIOs) sponsored a cyberinfrastructure visioning conference, which was held at UCLA. The goal was to prioritize and recommend a UC cyberinfrastructure plan of action for the next five years. The conference was a day-long event and featured panels discussing emerging digital scholarship and research trends and the associated cyberinfrastructure requirements these opportunities will demand. Over 140 UCR faculty, research support staff, and VCRs and CIOs participated.

The conference featured five panels as follows:

- Physical Sciences, Life Sciences and Engineering
- Libraries, Arts and Architecture, Theater Film and Television
- Management, Law and Public Affairs
- Social Sciences, Humanities, and Education
- Health Sciences

Other panels / presentations were provided by the National Science Foundation, CIOs (current technology initiatives), and faculty discussing "blue sky" possibilities.

Conference Themes

During the conference, several consistent themes emerged across the presentations and panel sessions. Importantly, as UC addresses these themes in the months and years ahead, it is essential these cyberinfrastructure, services, and support offerings be inventoried and be made transparently available to faculty, whether these services and infrastructures are supplied by a campus, the UC system, or cloud providers.

The seven themes below received particular attention from conference participants.

- Cyberinfrastructure "Concierge" Service (digital technology resource guidance)
- Collaboration Tools, Portals, and Services
- Storage Vision and Eco-System
- Data Management, Curation, Metadata / Interoperability
- Data Access – UC and Beyond
- Skills Development, Training, "Boot Camps"
- Polices and Ethical Considerations

Vision Document

In many ways, the 2015 VCR and CIO Cyberinfrastructure Conference was a call to action. Based on conference themes and observations, this cyberinfrastructure vision document has been created to offer prioritized recommendations and a series of action plans for each recommendation. This plan has been reviewed and vetted by UC's VCRs, CIOs, Librarians, and the over twenty UC faculty members who served as conference panelists.

UC's cyberinfrastructure vision provides a roadmap that will enable UC to optimally support the future success of its research enterprise. Clearly, data driven science, digital scholarship, and the associated (and enabling) cyberinfrastructures this vision document discusses are core to the University of California's collective ability to address the grand challenges facing California, the nation, and the entire world.

Defining Cyberinfrastructure

*G*iven the intensity of expectation around "cyber-enabled" research, the following terms are defined to distinguish key aspects of "cyberinfrastructure" and to facilitate discussion around UC's pressing need to take action. Cyberinfrastructure is itself an area of research that is developed and deployed institutionally as broad-area, shared infrastructure. Cyber-*enabled* research is the more expansive researcher-driven disciplinary and trans-disciplinary research that cyberinfrastructure facilitates.

a. **Cyber facilities** – the physical compute, storage, data center and network facilities and the operational standards, software and code that comprise the computational, storage and network system layers of cyberinfrastructure. Facilities include sophisticated routers, servers, fiber, cabling, data centers, power and cooling, etc.

b. **Cyber collaboration infrastructure** – tools, capabilities and processes that are layered on the cyber facilities
    i. *collaboration tools* for multiple research groups to work together with analytics, modeling, simulation and visualization capabilities
    ii. *software-based processes* for data management, data modeling, curation, preservation, and aggregation for accessing, reusing and building broadly used research data assets, as well as protecting and securing them
    iii. *cyber environments* for readily promoting, accessing, using and collaboratively building software applications, i.e., research software stores
    iv. *networked tools and mechanisms* for discovering and accessing expertise, both formally and informally and in directed team-based projects, to spark innovation, discovery and trial
    v. *network-based channels* for conducting team-based R & D securely, tech transfer that manages IP, processes that manage regulated data, etc. not only within higher education, but also with commercial and industry partners, recognizing that data are valuable intellectual property and technology transfer assets

c. **Platforms** – platforms combine *cyber facilities* (what we can think of now as basic needs) and *cyber collaboration infrastructure* (new, enabling tools and processes) to create integrated cyberinfrastructure facilities and services that, in aggregate, offer new functions, often taking into account the full research data life cycle or the end-to-end process of collaboration. An institutional research cyberinfrastructure platform might, for example, integrate network, computation, data, workflow and security facilities and services to facilitate the ability of researchers at different locations and institutions to progressively analyze data sets. Mobility services might be added to facilitate distributed human-centered data input. Different database structures might be integrated

to facilitate different data analysis and integration needs. A HIPAA compliant platform might make it possible to do health sciences research involving patient data. Discipline-specific platforms could be built separately or over general-purpose platforms.

d. **Sociotechnical infrastructure** – this term, in increasing use in higher education, refers to the *technical expertise*, *guidance*, *workflow*, *procedures*, *interfaces* and other human-technology interventions (such as the concierge service described later in this document) that facilitate the use of cybertechnologies by humans in the research environment. The importance of this type of service was stressed at the conference and must be developed in concert with the facilities and infrastructure that accompany it.

Summit Trends

A decade ago at the 2005 UC VCR-CIO Summit, the emphasis was on the *cyber facilities* needed to provide capacity and capability for high-performance computation-based research. The National Science Foundation (NSF) focus was on the national research network infrastructure, computation resource availability through the Teragrid, the build-out and aggregation of campus computational facilities, and the advent of Petascale facilities. The Top 500 competition had just become a metric of cyber research capability and leadership. Today's roles for research data, data management and managed storage were in early discussion.

By the 2011 Summit, the tenor of the discussion had shifted from cyber facilities to a direct focus on the researcher-defined, front-end research capabilities that comprise *cyber collaboration infrastructure*. Cyber facilities were not strongly referenced by frontline researchers, although IT infrastructure providers and the relevant infrastructure programs within funding agencies continued to strongly emphasize them. Data management and analytics were becoming a stronger focus, while the focus on facilities, especially physical facilities, had shifted to a focus on the tools and services that would more directly meet these research data needs. The 2011 Summit can be characterized as the moment when the importance of cyber collaboration infrastructure really took hold, and the questions of what tools were needed and how to invest in them were raised.

The 2015 Summit did not reveal significant differences in researcher perspectives on the importance of data, analytics, modeling and important tools. It did reveal a much more extensive cross-disciplinary research interest, an increased diversity of targeted uses, and an expectation of precision in findings, predictions and insights. All disciplinary areas now depend on data and analytics in some way. The 2015 Summit featured widely cross-disciplinary breakout sessions, and all disciplines noted the importance of infrastructure and expertise to support research data management, preservations and analytics (without using cyberinfrastructure terminology). Facilities such as compute, storage and transit were presumed to be essential but are not always present at the necessary levels. The term "informatics" was used frequently. The expected precision of solutions and team-based

informatics amplifies the dependence on agile and flexible research tools that facilitate shared, team-based research. This in turn generates further need for more a purpose-built integrated, end-to-end collaboration infrastructure, which we refer to here as *platforms*. The institutional role, and the need for platforms that no single researcher or research group can individually provide was underscored, along with the role of people and the importance of sociotechnical infrastructure.

The NSF's long-term vision for cyberinfrastructure stresses that the complexity of research analytics is increasing. Solving the grand-challenge problems of society has become an increasingly important priority but provides IT challenges. There is an unprecedented growth in data, both facilitated by technology and also in response to the improved ability to apply meaningful and timely analysis and action. This growth is expected to continue increasing dramatically for many years. Many of the grand challenges require approaches to "big data" and strategies to deal with data from new technologies (mobile devices or social media). More importantly, meaningful solutions demand interoperable expertise, capabilities and resources. Partnerships are required. As more data become available, interoperability and standards become important, as well as rational access, analytics, and archiving strategies. All universities have similar shared challenges: to reduce costs, create policies, address data management and curation requirements, etc. The successful universities will be those that leverage their unique strengths *and* an appropriately open environment of integrated, federated and/or shared resources, expertise and true partnerships.

These trends are reflected in other agencies and initiatives. The President's Council of Advisors on Science and Technology (PCAST) has recognized the role of digitization in the national economy. In response, the White House has established the Advanced Manufacturing Office in the Department of Commerce and the National Network of Manufacturing Innovation Institutes. To date, three of these institutes are directly related to information technology. The National Institute of Standards and Technology has reoriented many of its programs around "smart" technologies: Smart Buildings, Smart Grid, Smart Health, Smart Transportation, Smart Manufacturing, etc. The Department of Defense has oriented programs around a strong cyberinfrastructure emphasis on accelerated product and parts design, manufacture and management. The Department of Energy has oriented cyberinfrastructure initiatives around energy reduction, renewables, and environment, as well as the science around energy. The National Academy of Engineering has promoted the U.S. Grand Challenge problems that have led universities throughout the country to re-orient their educational programs in direct response.

Many new physical technologies such as 3D printing, materials development, etc., depend on IT and cyberinfrastructure. The concept of the Internet of Things is motivating the extensive connectivity of devices to the Internet, and the Industrial Internet Consortium is encouraging use of networked data. The Federal Communications Commission has supported network neutrality to preserve democratized access to Internet capacity and data. The Office of Science Technology Policy has strongly advocated the open publishing of data. The National Institutes of Health is investing resources to explore the opportunities and identify the challenges

associated with building a large research cohort with complex data elements (clinical, imaging, genomic) as part of the newly announced Precision Medicine Initiative. Germany, the United Kingdom, India, China, and Korea also all have large government-driven cyberinfrastructure initiatives.

An External View of UC

UC campuses are individually recognized as world-class research universities. Each campus supports a wide range of research and each campus claims particular areas of research leadership. When UC's research areas, grants, patents, scholarship recognitions, etc., are considered as a whole, the University is unrivaled as an institution. In general, though, UC research and cyberinfrastructure capabilities are operationally separated by campus, with little inter-campus visibility, access or interaction. Both in research and in cyberinfrastructure, UC is perceived as ten individual campuses, not as a system. Indeed, UC has a history of competing as individual campuses rather than aggregating strengths as a system or cluster of campuses when responding to state and national initiatives and funding opportunities.

Positioning UC Action

UC recognizes that cyberinfrastructure requires research and development in its own right. Research on cyberinfrastructure needs to be aligned and in lockstep with the frontline domain-specific research. Today's platform infrastructure research will become tomorrow's platform tools, used pervasively by our researchers to pursue innovative and next-generation research problems and needs. We need to recognize the transformational nature of cyberinfrastructure technology, the role of cyberinfrastructure research in facilitating frontline research, and the need to create a pipeline from cyberinfrastructure research to application.

The 2015 Summit generated a spectrum of topics worthy of consideration. However, seven of these received particularly strong, cross-disciplinary attention, as measured by how often they surfaced in the disciplinary sessions and summit panel sessions. They can be grouped into seven priority areas for UC action:

- Cyberinfrastructure "concierge" service
- Collaboration tools, portals, and services
- Storage vision and ecosystem
- Data management, curation, metadata / interoperability
- Data access – UC and beyond
- Skills development, training, "boot camps"
- Policies and ethical considerations

We can further organize them into the following four themes: (1) the *need for cyber collaboration tools*, (2) *strong cross-discipline desire for skills and access to expertise*, (3) *data as*

research assets to be managed, curated, and preserved; and (4) bringing it all together into a *platform "ecosystem"* that reflects *associated policy and ethical considerations.*

Cyber collaboration tools

1. *Enabling a broader base of researchers.* Easier-to-use, self-guided and more highly abstracted transformative tools and services that embody informatics expertise will enable a broader base of researchers to conduct novel research without having to develop or invest in the same expertise**.** In addition, new models for research informatics support will support researchers who may be in silos or who lack resources to establish independent infrastructure and support systems. Such models may also realize cost savings. Emerging technologies and access to standardized approaches to data management will be accessible to all faculty, including those in fields where such capabilities have traditionally been underdeveloped. Finally, widely available training for students, research staff and faculty in applying new technologies to research will help develop cyberinfrastructure skills into standard research techniques.

Cross-discipline desire for skills and expertise

2. *Cross-disciplinary collaboration.* Collaboration and partnerships across departments, schools and fields of study will increase our ability to solve complex research problems. Innovative approaches for generating, collecting, and analyzing data to bridge disciplinary languages, dictionaries, and areas of interest will provide vast opportunities for cross-disciplinary researchers to share ideas, data, tools, and algorithms and to approach research and global problems with a shared context.

Data as research assets

3. *Data ownership and big data*. Big data has three attributes: volume (scale), variety (its many forms, e.g., structured/unstructured, text, multimedia), and velocity (dynamism/real-time qualities). The ability to more readily collect, access and analyze data beyond the walls of the institution, and to store and analyze large amounts of disparate data (or big data) generated both locally and distally, will increase opportunities for new kinds of research, analysis and decision-making. Real-time dynamic data and analysis will transform traditional research approaches and methodologies by accelerating the generate-analyze-apply-learn cycle. Systems will use networked, information-based technologies to integrate intelligence in real time across entire enterprises and will use data-driven modeling, simulations and Key Performance Indicators to communicate optimal actions and results in real time. There are significant policy, regulatory, security, privacy and ethical issues to be managed.
4. *Multi-use data.* The line between operational, business and research data is

blurring. Data is quickly becoming dual-purpose or multi-use as organizations integrate potential research data collection more seamlessly into business workflow and operations. Policy and governance will be critical to efficiently and effectively manage data in organizations with potentially multi-purpose data innovative approaches to human subjects protection and compliance issues. Business operations will have to consider how to support business and research simultaneously.

5. *Data visualization.* Of increasing importance for managing large data sets, data visualization involves the graphic display of data too complex for manual processing or assessment; the resultant imagery is typically the end result of an algorithmic process or generated from large-scale data sets. It encompasses a broad range of analytic tools and techniques that include statistical visualization, GIS, and 3D modeling, all of which share the common goal of organizing data into a coherent visual display that can be readily interpreted and understood.

Platform "ecosystem"

6. *A federated but connected and interoperable infrastructure of platforms*. This will be key to helping the campuses enhance capacity and capability individually and across the system. Such infrastructure will extend the tools and capabilities that form the institutional "nervous system" (distributed resources, capabilities, expertise, policy and ethics) through which data can be moved and methodologies accessed. Organized for campus leverage, this federated infrastructure will cultivate individual researcher capability. Mobile information and communication technologies will play a major role. Policy will be an important driver, and initiatives need to reflect the ethical values that the UC wished to project.

<u>Recommended Actions</u>

[Please note that several Action Items contain timelines while others do not. Timelines for all action items will be created once the Steering Committee has reviewed the recommendations / actions items and has prioritized them.]

ACTION 1: Build the policies necessary for a federated approach to shared services.

UC is a wellspring of innovation, new ideas, and creative approaches, which occur in parallel across campuses. There is significant untapped potential, however, to link best practices and to federate services as an *additional* mechanism to services that are shared simply by extending capability provisioned on one campus to others.

A federated research cyberinfrastructure by definition involves distributed resources and capabilities in the form of staff, facilities, services, investments and individualized campus models that have been structured and configured to align to particular researcher-defined areas of emphasis, and to research partnerships, as

well as the campus' mission, culture and location. A federated approach to frontline faculty research at each campus, across our campuses, and across the full diversity of research partnerships will better align cyberinfrastructure capabilities, including research and development on research cyberinfrastructure itself. Federation builds from a starting position that each campus has and needs to build local capacity and capability to its strengths and needs. Federation then addresses the ways that these individual campus capabilities are not only supported but also significantly enhanced through shared visibility and appropriately shared and/or integrated capabilities through cross campus infrastructure, platform and sociotechnical collaborations that create win-win situations. Federation also addresses the ways that individual campus research and capabilities can be formed into a collective strength.

Currently, UC policies are not organized to facilitate federation or collaboration. Specifically, policies, practices, and incentives often encourage the creation rather than the dissolution of silos. While exceptionally difficult, UC should tackle and promote the development of "federated services" that result in "deploying once for the benefit of many campuses." The following actions are essential to develop and promote federated services.

- Establish as an organizing principle a systemwide "research cyberinfrastructure federation" of services, platforms, technical expertise, and accessible, reusable research data. Federated services need to be distinguished from centrally shared services with respect to approach, resources and operations. A federated service is the true value-driven coordination of services drawing upon the strengths and diversity of the distributed approaches. This is very different from centralization, which implies centralized provisioning and then extended access. Federation and centralization are not mutually exclusive, just different. Although a "federation" is challenging to the currently fully decentralized business and financial structures of the UC system, it is highly valuable. Precisely because of the broad nature of individual campus research strengths, UC is well positioned to build and demonstrate the power of federation. UC federated services would allow individual campuses to retain their interests and strengths, and to build on them and draw on crossover strengths where there are multi-campus benefits. Federation should be used to create interoperability opportunities that take advantage of the infrastructure and expertise at each campus for the purposes of accelerating, enhancing and promoting the development of each campus's unique research strengths.

- To make this work, determine the appropriate infrastructure (such as network connectivity), transparency, and incentives necessary to facilitate federated resource sharing between campuses. Federated resources must not be determined solely in a top-down, system-level manner, but must be allowed to emerge from individual or collaborative campus efforts and identified and selected for federation. Bottom-up structures are often more agile, approach

new technologies sooner and address a broader range of disciplinary and cross-disciplinary research activities. Top-down transparency, organization and facilitation can be combined with campus-level development, expertise, and emerging skills to maximize impact.

- Break down policy barriers to collaboration with specific timelines and the following deliverables:

    - *Inventory of services, systems, and support.* Strategies are needed to communicate the existence of shared services and to facilitate inter-campus use of such devices, systems, tools, and services.

    - *Institutional support for sharing services across the UC system.* The barriers to entry for sharing and utilizing common tools across campuses must be eliminated or greatly reduced. These barriers include financial, cultural, incentive, policy, and organizational constraints.

    - *Federated services strategy.* Importantly, not all campuses must utilize a particular service, nor it is necessary for all shared services to be provided by UCOP or a particular campus or center. Rather, UC's strategy should recognize that intercampus collaborations of two or several campuses or research centers might generate significant efficiencies and benefits. (This does not preclude such services being identified as shared service opportunities at a later time.)

    - *Common approach to data access, security, etc.* UC does not have a common (campus, discipline, health sciences) approach to data access, security, availability, etc. UC should develop and support a suite of transparent policies, procedures, and incentives that are easy to understand / utilize and that promote the wide availability of data and resources within UC. Issues that must be addressed include compliance (e.g., HIPAA), security, bio-ethical topics, and clinician / researcher relationships.

    - *Ethical considerations.* As access to data increases, UC must ensure appropriate policies and standards for privacy, confidentiality, data ownership, public / private partnerships, etc., are considered and adopted.

    - *External (non-UC) data.* UC must investigate policies and practices relating to data security, access, privacy, etc., that will facilitate the acquisition of data from organizations, firms, and other groups outside UC.

- Create a **UC Cyberinfrastructure Institute** tasked to define, build, stage and orchestrate federated *and* centralized operations and policy.

    - Federation needs to be viewed as an operation in its own right that facilitates and sustains value-driven federation-oriented policy, infrastructure activities and interoperability collaborations, which together produce measurably increased campus and collective research capability and capacity. In sharp contrast to centralization, federation involves sustaining an evolutionary development lifecycle that will generally consist of (1) identification of a high potential federated capability, (2) an inventory and visible exposure of campus capabilities, e.g., websites and workshops, (3) a detailed review of federated potential, consideration of approaches and funding, policy and capacity needs/barriers, (4) a highly visible pilot orchestrated with a small subset of campuses to champion, demonstrate and shape an approach, (5) resolution of funding, policy, infrastructure or capability barriers, (6) scaling from the successful pilot, moving to operational requirements and scaling to critical mass interest and (7) adjusting and sunsetting a capability when requirements, technologies and value changes.

    - To execute on this development pattern, a working group for each potential federated capability needs to be identified. Each working group must be supported with increasing involvement and project management. This will ensure the demonstration of value and review on the merits of capability, and will avoid the loss of capabilities because of lack of support, resources or commitment at any one step. Federated capabilities that survive the pilot process need to be able move into a managed operational start-up and scale-up mode with identification of appropriate federated value, investment in resources, and resolution of policy barriers. The VCR-CIO Summit identified a first slate of candidate federation capabilities. The descriptions for each of the following recommended actions provide proposed agendas for the associated working groups.

    - A **Federation Governance Board** (FGB) should be established and staffed as the initial federation operating entity. As a start-up itself, the FGB will be responsible for prioritizing federated capabilities, commissioning working groups and supporting and orchestrating the activities of each working group. The FGB must include a funded project management position, since it will need to coordinate and manage resources from the beginning. This need will only grow as the first federation capabilities move into the pilot steps. As capabilities become operational and others enter the development process, the FGB will need to become an operating entity. The FGB should eventually form a UC business entity, a

UC Cyberinfrastructure Institute, responsible for federated operations. The FGB should comprise two VCRs, two CFOs, two CIOs, two librarians and several key faculty members from multiple campuses. The FGB will interact with campuses through existing senate and administrative structures, as well as create events, such as workshops, to define, shape and build operational direction and interest and to build the infrastructure needed to facilitate capability.

ACTION 2: Make research data an institutional asset.

It is important to acknowledging the role of research data as valuable University intellectual property, and to develop and implement a set of guidelines for its management. Further, it is important to develop new – and integrate existing – tools and services based on these guidelines, bringing together local campus data management initiatives and system-level tools where appropriate. The libraries' critical role in building research data into a University research asset emerged strongly in the Summit — issues relating to data management (short and long term), data quality, curation, retention practices, and metadata structures that enable interoperability, etc., are foundational to optimizing UC's effectiveness and cementing UC's reputation as a leader. UC must leverage expertise within its libraries and partner with technology organizations to address this important need.

a. ***Create a Working Group to guide development***. The Working Group will include three librarians from different campuses across the system, including one representing CDL, and two to three research-focused technologists and/or data-intensive faculty members from different campuses and who are broadly knowledgeable about their local campus research products. A working group lead responsible for guidance and deliverable management will be designated. The lead will serve as (or designate) a liaison to the FGB/Institute. The group shall consult with a minimum of ten faculty members (drawn from multiple campuses) whose research produces a range of data types from representative communities or domains (e.g., data types common to multiple campuses or particularly associated with UC research). The working group will be designated for one year and tasked with the following deliverables:

    - ***Write a canonical set of data guidelines, based on community standards, funder mandates and UC policies (by February 1, 2016).*** These guidelines should not be particular to any campus or domain, but apply broadly to data produced across the system. These guidelines will necessarily be basic, to encompass the wide array of data, and will be driven by practical concerns, including sharing mandates and technology requirements.

    - ***Complete a survey of existing data tools and services in the UC system (by April 1, 2016).*** This survey will expose the current data infrastructure

landscape at the campuses and CDL, and should highlight common goals and services, competing goals and services, and gaps. Significant work has already been done in this area, and this survey will help avoid duplication of effort. Where appropriate, this survey will include information on what is being done at local campuses.

- ***Produce a practical online "data guidebook" for researchers (by August 31, 2016)***. Based on the data guidelines and survey, this guidebook should contain a concise set of directions for data producers, indicating the "UC approved" data services available to them, with clear ties to funder compliance. This document will also include relevant information about local campus processes and services, as outlined in the survey.

- ***Produce a "Data Management at UC" manual that explains in depth the current state of data services (by August 31, 2016).*** This document should be a deep-dive into all of the relevant facts of data management in the UC system, including policy and compliance issues, technology and infrastructure options, and the role of libraries in research. The document will have two main purposes: 1) To provide the foundation for the "Data Guidebook," giving clear and transparent explanations for all decisions and recommendations; 2) to serve as a living document that leads the UC into the immediate and longer future, giving an initial set of guideposts for future data asset management. This could include goals for future funding opportunities, shared development, and new policies.

- **Create an ongoing process to actively monitor and maintain the data services landscape.** The "Data Guidebook" and "Data Management at UC Manual" will need to be updated and maintained on a continuous basis. The working group (or a future group created after the initial year) will be in charge of ongoing updates managed by the institute, with the actual work to be done by key stakeholders.

ACTION 3: Scale discipline-similar requirements.

Not all research areas have large, concentrated discipline-specific data needs that are accommodated by formal structures, such as centers. There is a huge diversity of research and scholarship programs working with smaller and equally valuable data assets. These programs may lack the ability to scale data resources. Institutional and cross-institutional discipline-specific data resources should be leveraged to allow smaller data assets to take advantage of shared resources and scale.

a. ***Create a Working Group to guide planning development.*** The Working Group will include the follow membership three to six faculty members from multiple disciplines with data as defined within this initiative and three to six support staff knowledgeable about data repositories, metadata, and collaboration tools. A

working group lead responsible for guidance and deliverable management will be designated. The lead will serve as (or designate) a liaison to the FGB/Institute. The working group will be designated for one year and tasked with the following deliverables:

- ***Data Assets – Vision for discovery and asset description.*** The Working Group will develop, vet, and gain consensus on a plan and suite of data asset descriptors that will define and describe data assets as they are discovered and documented for collaborative use. These data asset descriptors will enable the development of a centralized catalog of data assets. The descriptors will include the tools, services, and systems that are utilized to deliver and maintain the data asset.

- ***Vision for a Data Asset Resource Catalog.*** The Working Group will develop, vet, and gain consensus on the specifications / vision for an online system that will enable UC researchers and digital scholars who are stewards of relatively smaller, individual data resources to register their assets with a centralized catalog/service listing data repositories.

- ***Creation of a Data Asset Resource Catalog.*** The Working Group will serve as an oversight / advisory group to the technical team that will create / acquire (e.g., vendor or cloud service) the online digital asset repository system.

- ***Phase II – Data / research collaboration tool.*** In Phase II, the Working Group will develop, vet, and gain consensus on the specifications / vision for an online system that enables researchers and digital scholars to share information about their data assets and to establish connections for collaboration as part of inter-campus teams. This effort will be tightly linked to other initiatives aimed at creating online data / research collaboration platforms and may include the development of a UC Researcher Profile tool.

- ***Other considerations.*** To support its overall efforts, the Working Group will create a timeline for completing the tasks noted in this document and will also note and escalate any policy issues / considerations that are discovered. Additionally, the Working Group will create a vision for supporting and maintaining this service over time.

ACTION 4: Position health, patient and clinical data.

The five UC medical centers and many health science programs and their attendant health, patient and clinical data present unparalleled data assets for research. The UC ReX and Big Cogito pilot are examples. Key challenges will be standardization of terminology across UC, and the development of appropriate policies and data

governance that allow UC to simultaneously work as one collaborative system in certain situations while promoting healthy competitive innovation and excellence as individual campuses.

a. ***Create a Working Group to guide development***. A relatively small Working Group will be identified and charged with executing the steps listed below. The Working Group will include three School of Medicine CIOs, and two to three research-focused data-intensive faculty members from the Schools of Medicine and who are broadly knowledgeable about their local campus research products. A working group lead responsible for guidance and deliverable management will be designated. The lead will serve as (or designate) a liaison to the FGB/Institute. The group shall consult with a minimum of ten faculty members (drawn from multiple campuses) whose research produces a range of data types from "omics" to "sensing" to patient-reported data to clinical data. The working group will be designated for one year and tasked with the following deliverables:

    - Define a HIPAA compliant approach and infrastructure to advance research collaboration.

    - Identify data workflows, interfaces, and standards to allow for precision medicine within the electronic medical record.

    - Determine a model that provides easy access to de-identified clinical data to faculty outside of the School of Medicine or outside of health sciences.

    - Examine challenges around specific types of data, such as imaging or whole genome as it relates to storage and high performance computing, and report recommendations.

    - Highlight data visualization needs for clinical trials research or research around medical decision making or quality improvement.

    - Engage the lay public – patients and the community – in hypothesis-generating activities around clinical and medical questions.

ACTION 5: Develop systemwide and campus "concierge" services.

"Concierge" (digital technology resource guidance) and related sociotechnical services will bring federated expertise and capabilities together to help guide faculty to the appropriate cyberinfrastructure services to meet their research needs. This was a strong theme at the Summit, with the aim of reducing faculty search time and bringing cloud, national, UC wide and local campus cyberinfrastructure capabilities together. UC needs to sponsor and create "ask an expert" services and provide "how to do things or get things done" guidance.

a. ***Create a Working Group to guide development***. The Working Group will include four to six digital technology staff or management from at least four campuses and who are broadly knowledgeable both their local campus and cloud resources. A working group lead responsible for guidance and deliverable management will be designated. The lead will serve as or designate a liaison to the FGB/Institute. The group shall consult with a minimum of ten faculty members (drawn from multiple campuses) whose research requires technology from multiple campus or off-campus resources (e.g., cloud computing, server colocation, local storage, library curation, instructional technology). The working group will be designated for one year and tasked with the following deliverables:

   - ***Identify a lead Digital Technology Resource Advisor ("concierge") for each campus (by January 1, 2016).*** The Working Group may develop additional guidelines for selection and will work with campuses to provide a nominee. These should be high-level professionals or middle management with a clear understanding of their campus's digital technology resources, excellent connections across campus technology providers, a broad understanding of available cloud services and their appropriateness in research applications, demonstrated understanding of the research process, and strong communication skills. These personnel will participate in the systemwide Digital Technology Resource Advisory (DTRA) team and will act as leads for teams on each campus.

   - ***Develop systemwide team charge (by February 1, 2016)***. The systemwide DTRA team will maintain the systemwide digital technology resource index, make references across the system for needed resources, and share best practices and case studies to ensure the highest level of service within each concierge group across the system. The charge should include modes of communication and frequency of meeting for the systemwide team. The systemwide team will be a long-term commitment with a regular communications schedule. The Working Group will refine and flesh out this charge and submit it for Oversight Committee approval.

   - ***Develop guidelines for services and resources to implement at campus and systemwide levels.*** In collaboration with the FGB/Institute and the working groups responsible for federation/shared services, research data management, cyber-platform interconnects, software stores, expertise, and others as appropriate, determine where such services and resources will be located and how they will be supported on an ongoing basis.

   - ***Develop campus-level plans for funding and implementation of digital technology concierge services at each campus (by August 31, 2016)***. In partnership with each campus's VCR and other appropriate stewards, the Working Group will guide each campus in developing an appropriate local

plan to staff a funded team that will provide high-level digital technology resource advice directly to faculty. Campuses are expected to commit funds and human resources to support this important service.

ACTION 6: Build cyber platform interconnects.

UC needs to agree on standards and build the necessary campus network interconnects, scheduler technologies and cloud service management technologies to make it possible for federated facilities and tools to interoperate. This will enable UC to take advantage of cross-system and commercial cloud technologies to assemble services for particular research needs. It may also realize efficiencies.

a. ***Create a Working Group to guide planning development.*** The Working Group will include three to six faculty members whose research might benefit from service federation and/or who are currently utilizing tools that are or would benefit from federation, and three to six support staff who are knowledgeable about various research technologies and the interconnects / middleware available to interconnect these tools. A working group lead responsible for guidance and deliverable management will be designated. The lead will serve as (or designate) a liaison to the FGB/Institute. The working group will be designated for one year and tasked with the following deliverables:

   - ***UC Information Technology Architecture Group (ITAG).*** The Working Group will explore various partnerships as it creates its project plan, including leveraging the UC ITAG group that provides inter-campus architecture / middleware support for UC's operational and analytics / decision support systems.

   - ***Federated repository design.*** The Working Group will engage in the following activities that will yield a prioritized roadmap for platforms that might benefit from the UC sponsored / developed / support interconnects (These efforts will be tightly linked to other initiatives aimed at creating and facilitating cyberinfrastructure federation or the creation of cyberinfrastructure shared services.):

     - Develop, vet, and gain consensus on specifications for a catalog of platforms (systems, tools, other assets, and cloud resources) that are priority candidates for federation.
     - Ensure this catalog also describes the method (or methods) that are most commonly used to interconnect these platforms.
     - Record the disciplines that are (and will be) positively impacted by federating these tools, prioritize opportunities for interconnecting the platforms based on the positive impact to UC's research enterprise, and produce a roadmap with timeline and milestones.

- ***Creation of interconnect resources.*** The Working Group will serve as an oversight / advisory group to the technical team that develops / acquires and deploys the various interconnect services.

- ***Other considerations.*** To support its overall efforts, the Working Group will create a timeline for completing its tasks and will note and escalate any policy issues / considerations that are discovered.

ACTION 7: Build a software store*.*

UC must create a software brokerage infrastructure and appropriate policy for sharing/promoting/buying software applications across the UC system. Similarly, the UC federation should be set up to facilitate a technology channel for data and software with respect to internal and external partnerships. Collectively, UC research is a major producer of software and this asset can be leveraged within the system to enhance research achievements for all.

a. ***Create a Working Group to guide development***. Commission a Working Group by November 2015 comprised of representative members from the following areas: software license managers for academic software, software IP and licensing, UC Research Technology Group (RTG) member experienced with research software, Educational Technology Leadership Group (ETLG) members experienced with educational software, librarians experienced with curation, and a finance person experienced with sales and service of software models. A working group lead responsible for guidance and deliverable management will be designated. The lead will serve as (or designate) a liaison to the overall FGB/Institute. The working group will be designated for one year and tasked with the following deliverables:

   - ***Create an inventory of use cases and models.*** Inventory use cases and categories of software sharing/transaction potential as well as software sharing systems and models across UC campuses and post by February 2016. Include:
     - Internal and external to UC, contributing and using
     - No cost, at cost, buying, supported, unsupported
     - Open source, experimental, level of validation, certification
   - ***Develop criteria and evaluate.*** In parallel, inventory, establish evaluation criteria, and evaluate structures and operating models for national software exchanges and post by Spring 2016. Examples include:
     - A number of national disciplinary institutes have software sharing and download frameworks – Hubone at Purdue
     - The Digital Manufacturing and Design Innovation Institute (DMDII) out of Chicago has partnered with GE on a national software store
     - The Smart Manufacturing Leadership Coalition is building a national software store with an integrated deployment

infrastructure
    - UC and IMS have partnered and prototyped a federated store for software sharing called CASA – Community App Sharing Architecture
- ***Make recommendations to the UC IT Leadership Council (ITLC)***. Review the evaluation matrix with the RTG and ETLG and recommend to the ITLC one or more structures to be considered for pilots, as well as how to structure them, by March 2015.

ACTION 8: Support and build on UC's expertise.

Finally, it is essential to develop platform tools that bring researchers and their work into a more visible, discoverable state to facilitate shared expertise and to increase the potential for collaboration. For example, how does one researcher find another researcher doing something similar with cyberinfrastructure, especially across disciplines? We need to invest in the professional development of research IT staff across the UC system, and build a collaborative cadre of such staff across the system. By staff, we include the full range of domain experts who choose non-faculty career paths supporting researchers, as well as IT experts in infrastructure technologies who keep research operations running. Professional development includes the soft (interpersonal) and hard (technical) skills needed so that research IT professionals can move comfortably from helping to address local problems to participating in cross-campus and multi-campus collaborations.

a. ***Create a Working Group to guide development***. The Working Group will include 3-5 digital technology representatives and 2-3 Library representatives from at least four campuses with broad knowledge of both their local campus and cloud resources. A working group lead responsible for guidance and deliverable management will be designated. The lead will serve as (or designate) a liaison to the overall FGB/Institute. The working group will be designated for one year and tasked with the following deliverables:

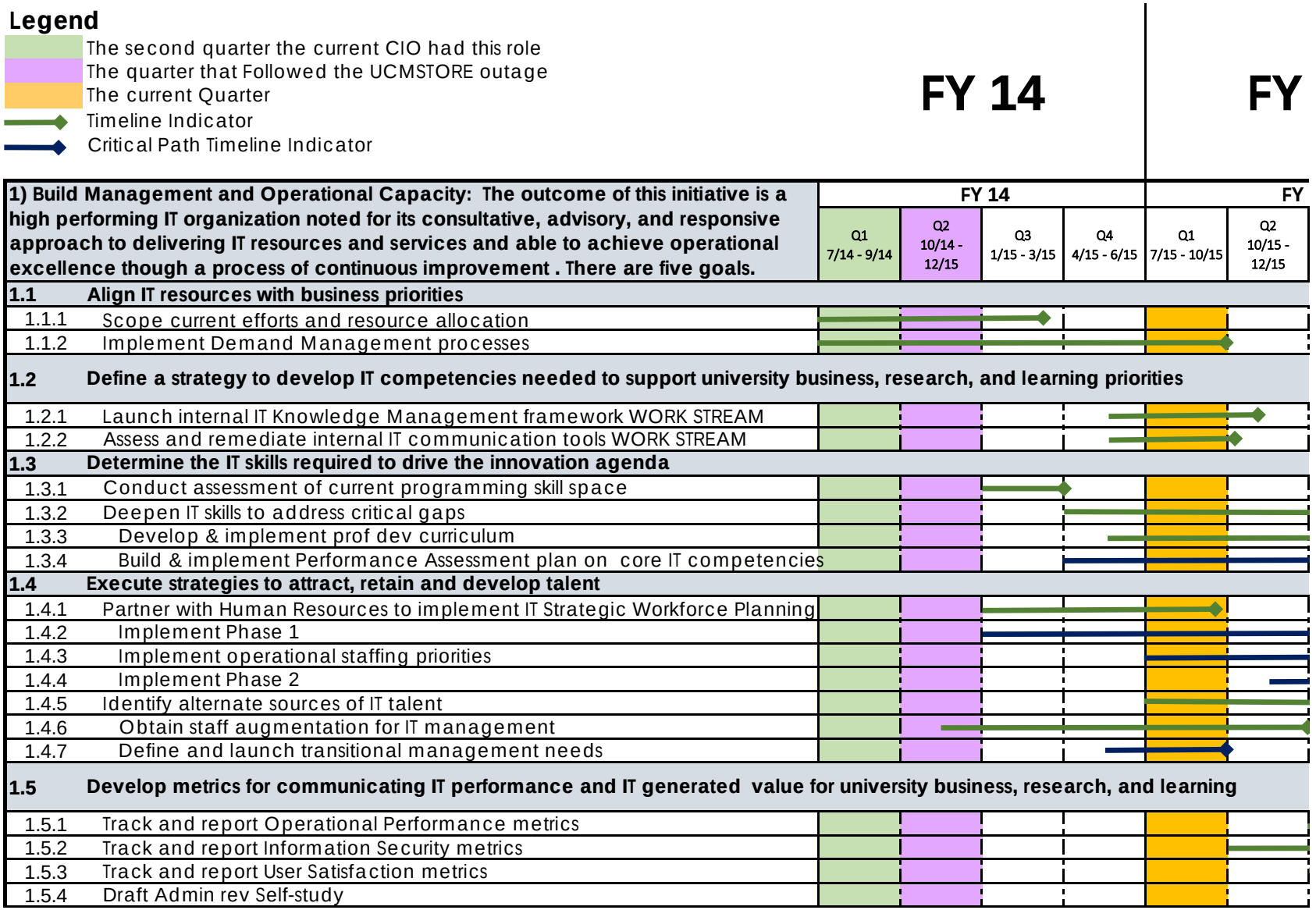
    - ***Survey and identify current offerings and best practices (by February 1, 2016)***. The Working Group should communicate with all campuses to survey current offerings in the areas of faculty profiles and research catalogs; other tools that enable the sharing, discoverability, and research collaboration for data, expertise and tools within the campus research community, and formal IT staff training opportunities. They will also study current collaboration and training models at other higher education institutions, EDUCAUSE and other organizations. They should work in cooperation with the federation/shared services, research data management, cyberplatform, and "concierge" working groups during this discovery phase. An online report of findings on collaborative offerings, training offerings, and observed best practices should be produced.

- ***Develop training and internship recommendations (by April 1, 2016).*** Based on the results of the survey, the Working Group should identify recommendations for cross-campus and centralized technology and soft skills training that the Institute should provide or coordinate. They should also recommend a structure for cross-campus internships that facilitate the sharing of new technology competencies across the system. These recommendations should be presented in a report to the FGB/Institute.

- ***Produce an online "Guidebook for Building UC's Technology Expertise" (by June 1, 2016).*** Based on the survey findings, the recommendations in the report, and subsequent analysis by the Working Group, and in collaboration with the cyberplatform working group as appropriate, the Working Group should publish a guide providing best practices for developing UC's technology expertise across the system.

Legend

- The second quarter the current CIO had this role
- The quarter that Followed the UCMSTORE outage
- The current Quarter
- Timeline Indicator
- Critical Path Timeline Indicator



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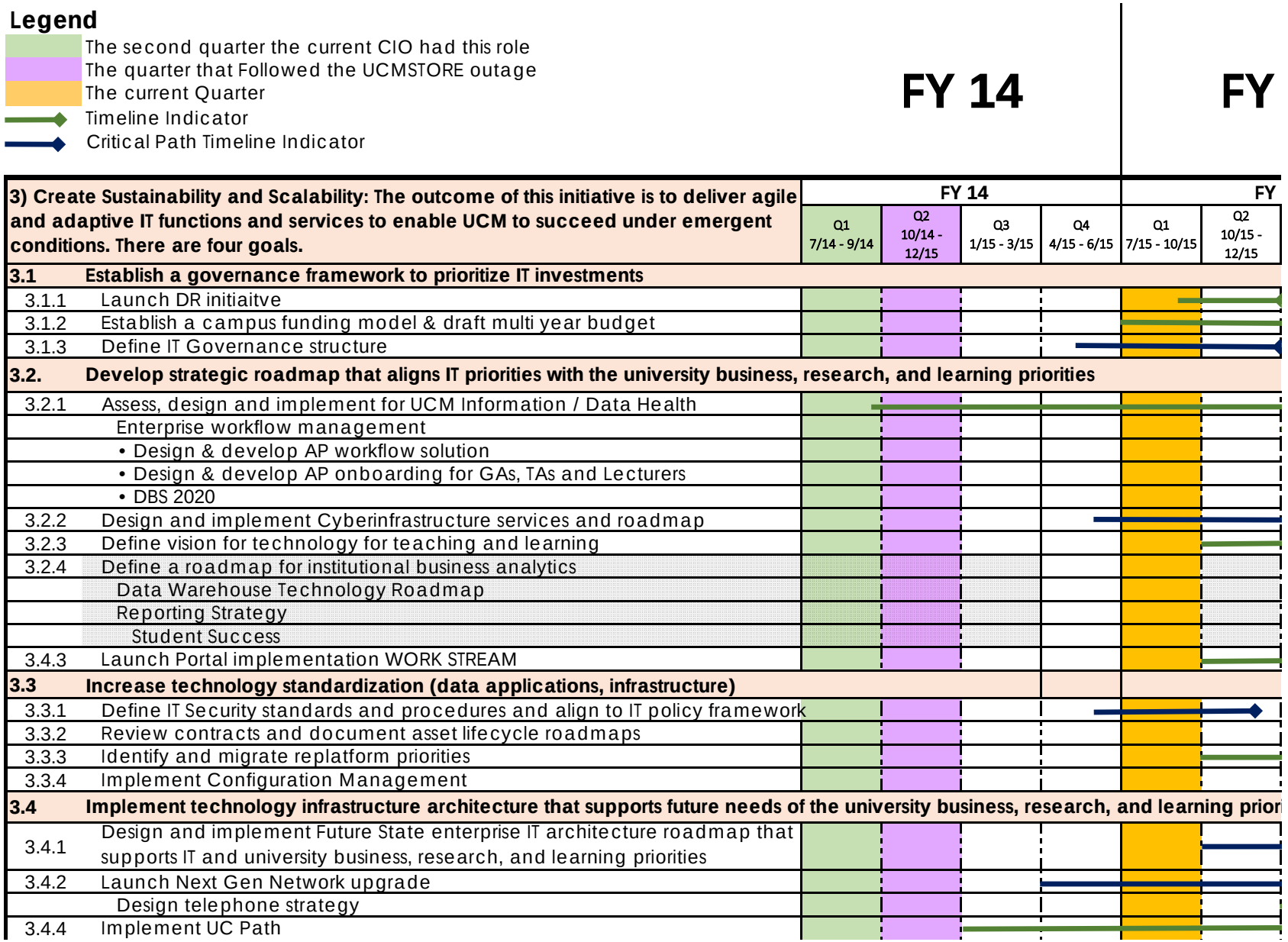
- The second quarter the current CIO had this role
- The quarter that Followed the UCMSTORE outage
- The current Quarter
- Timeline Indicator
- Critical Path Timeline Indicator

2) Fix IT: The outcome of this initiative is the coordinated delivery of operation excellence as a foundation for UCM innovative, growth and transformation. There are three goals.		FY 14					FY
		Q1 7/14 - 9/14	Q2 10/14 - 12/15	Q3 1/15 - 3/15	Q4 4/15 - 6/15	Q1 7/15 - 10/15	Q2 10/15 - 12/15
2.1	**Decrease complexity in the IT environment**						
2.1.1	Develop an IT Application Roadmaps for current applications						
2.1.2	Develop an IT Infrastructure Roadmaps for systems and to deliver applications						
2.1.3	Complete VME migration						
2.1.4	Datacenter Storage redesign						
2.1.5	Pilot and Launch SCCM						
2.1.6	Build and execute an IdM Roadmap WORK STREAM						
2.1.7	Build and execute a classroom technology roadmap WORK STREAM						
2.2	**Deliver consistent. High-quality IT services that meet service level objectives**						
2.2.1	Establish High Availability for mission critical enterprise applications and systems						
2.2.2	Develop and implement an Incident Management process WORK STREAM						
2.2.3	Automate Change Control						
2.3	**Define and manage the IT service catalog and service level agreements**						
2.3.1	Define a Service Request model						
2.3.2	Develop service management model for cloud-based services WORK STREAM						
2.3.3	Develop service management model for mobile and web-based application development requests WORK STREAM						
2.3.4	Define SLAs for each service						
2.3.5	Launch Service Now for IT service requests						

Legend

- The second quarter the current CIO had this role
- The quarter that Followed the UCMSTORE outage
- The current Quarter
- Timeline Indicator
- Critical Path Timeline Indicator



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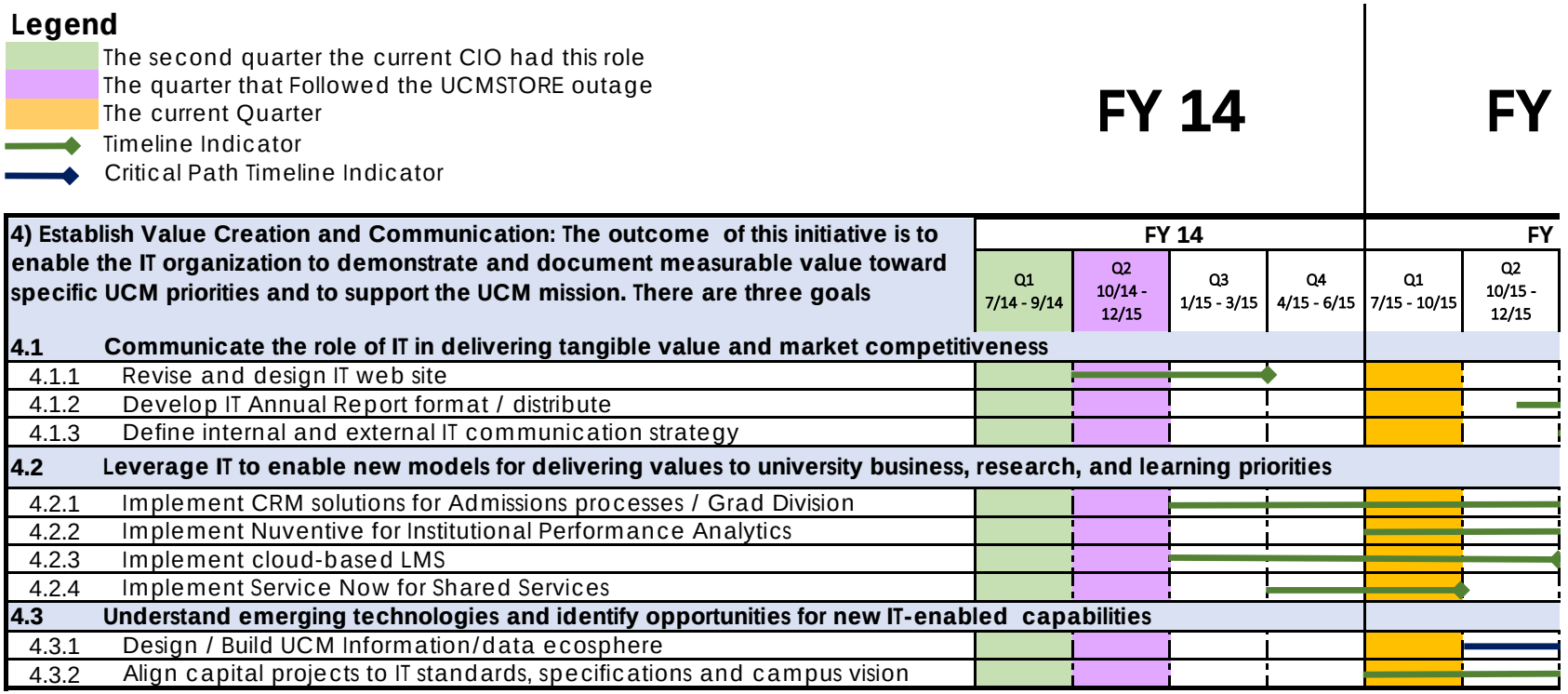

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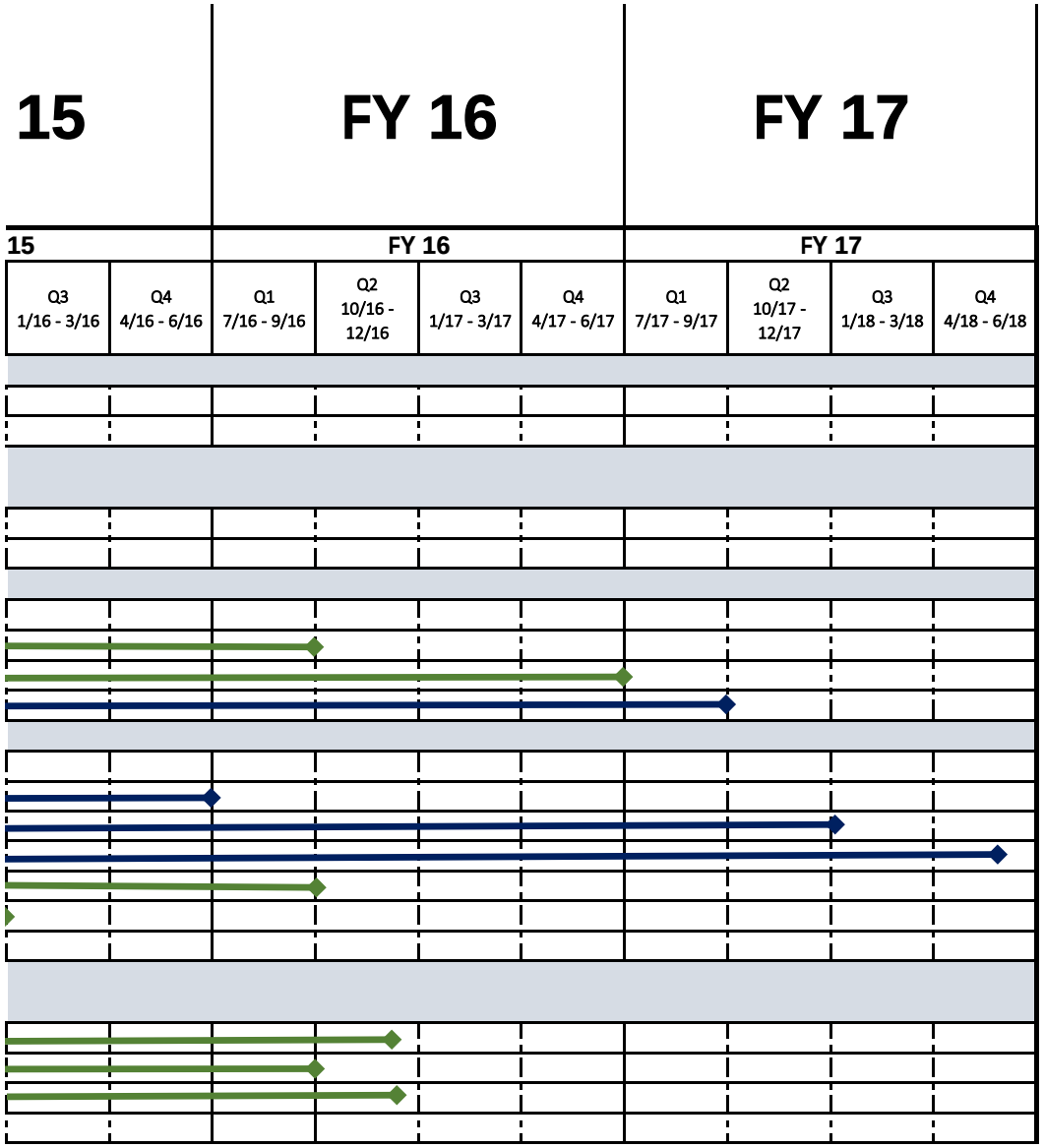
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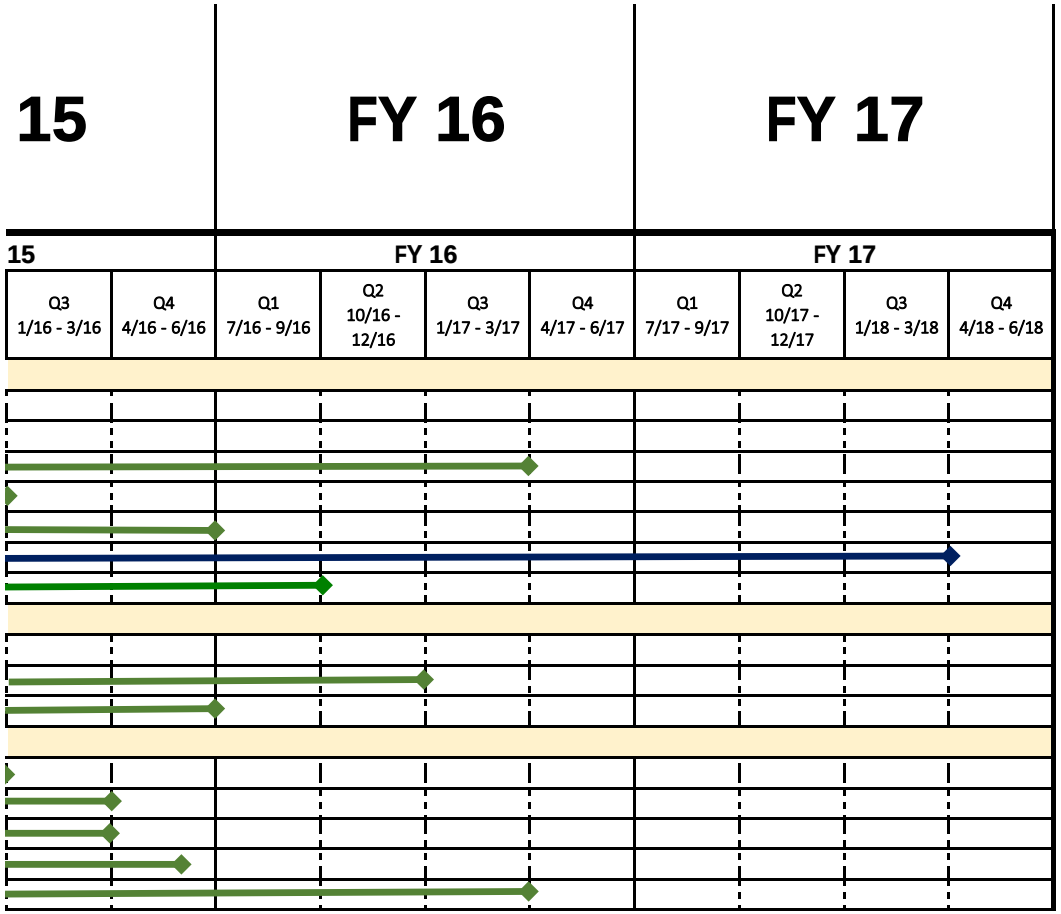
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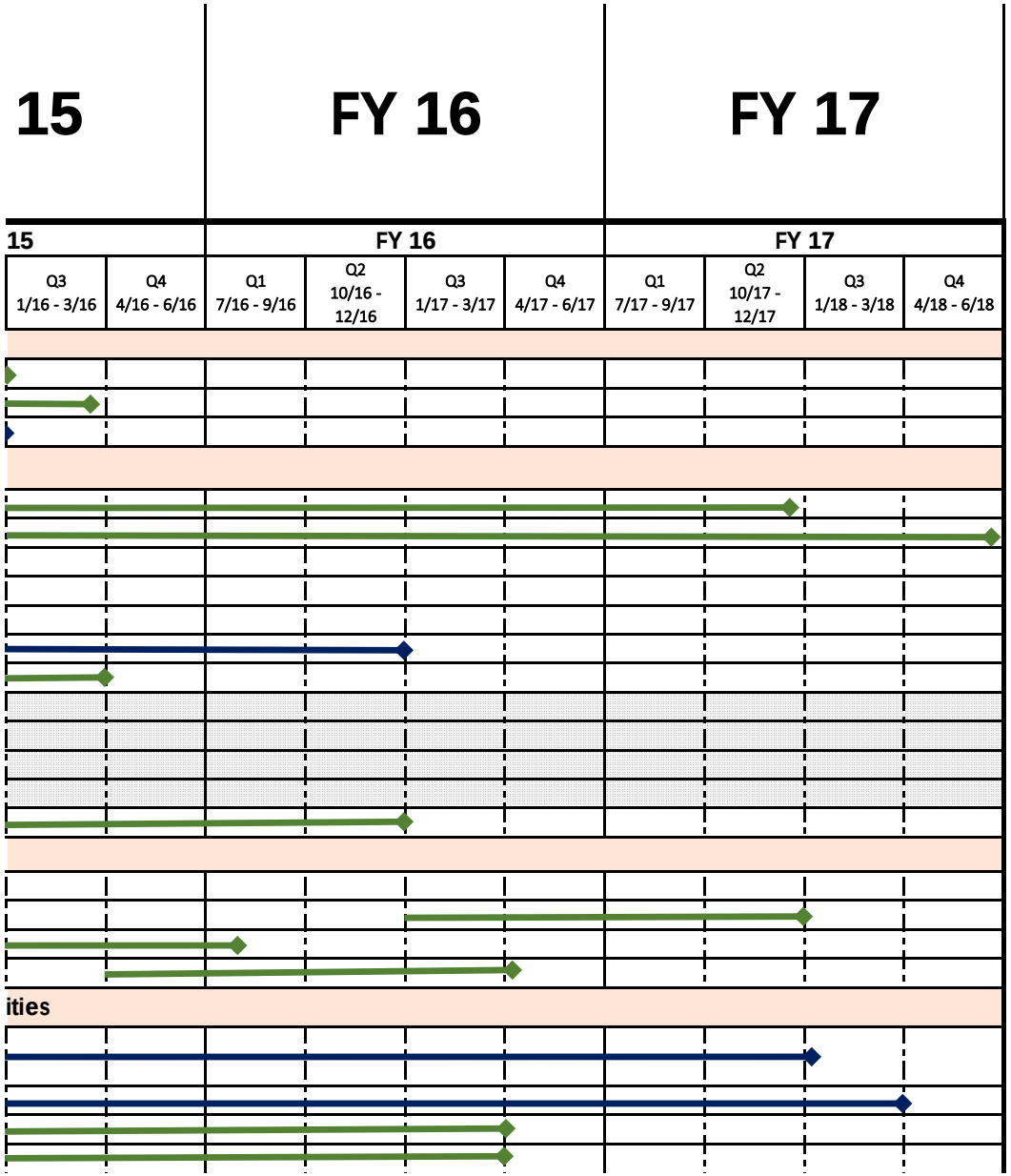
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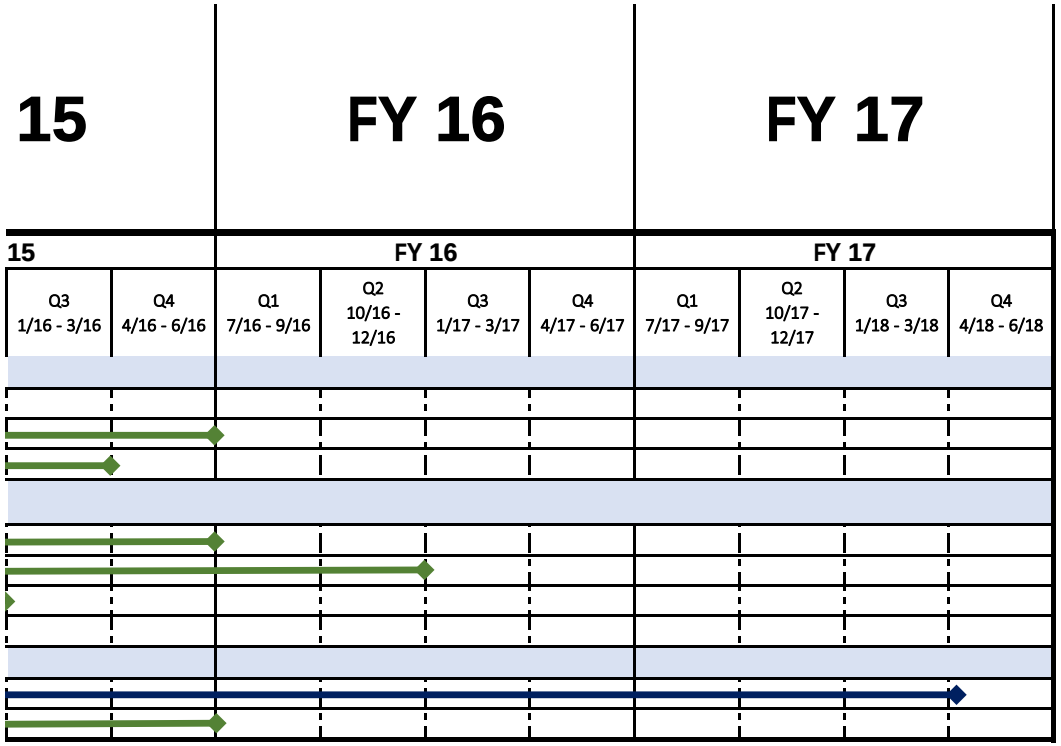
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Academic Senate-Administration Library Working Group Final Report

The Academic Senate-Administration Library Working Group (LWG) met three times during the 2013 Fall Semester to address the items in its charge. In addition, the LWG solicited comments from stakeholders from the faculty, student body, and administration.

The LWG reached consensus on two matters. First, the library is an academic unit and the library budget needs to grow significantly in order to reflect past growth at UC Merced and to keep pace with continued growth. The current budget is not adequate to meet the diverse requirements for print and digital information and scholarly communication at a research university, nor to address inflation in scholarly information costs. Second, the LWG strongly supports the creation of a permanent Library and Scholarly Information Advisory Committee with a membership and charge akin to such committees at other UC campuses (see Appendix A). The Library and Scholarly Information Advisory Committee should be charged with addressing the major library issues and potential directions that the LWG surfaced, which include:

Budget

- How, and how much, to grow the library budget and staff to support all areas of activity as the campus adds faculty, students, and new programs.
- Potential budget impacts of open-access publishing, cost inflation of scholarly information, and changing models for acquiring and accessing information.

Space and Infrastructure

- Library public spaces are being used at maximum capacity.
- Space for printed books. There is sufficient stack space to get to 2020, but space needs for 2030 and beyond are uncertain.
- There is not enough space for physical non-book materials to get to 2020, such as manuscripts, university archives, art work, and realia.
- There is a need for digital labs and workspaces, staff and network/hardware infrastructure for digital collaboration and for activities such as data curation. Campus core facilities with missions synergistic to the library (e.g. digital humanities, spatial analysis) could be located in the library.
- Possible solutions include (re)claiming space in Kolligian Library Building or creating library common spaces in new buildings.

Non-Commodity Information

- Non-commodity information is any campus-generated information (physical or digital) for which the campus or individual researchers retain or are granted usage rights.
- Assist researchers in handling non-commodity content through the entire lifecycle of collection, digitization, design, analysis, sharing, discovery, and archiving.

- Management of digital and physical non-commodity information produced as the result of research, instruction, or campus initiatives to digitize and/or preserve non-university information.

Educational Role

- Develop research-ready students (undergraduate and graduate) who have the skills to discover, access, evaluate, and apply information throughout their scholarly, professional, civic, and personal lives.
- Identify and acquire core print and digital collections that are adequate and systematic in coverage and appropriate to student learning and research in all disciplines and at all levels from general education through Ph.D.
- Respond to newly enhanced WASC requirements for information-literacy outcomes and provide in-person and online information-literacy instruction.
- Provide library support for online courses as they emerge.

Research Role

- Support campus research by developing mechanisms to identify collection needs and by providing access to adequate and comprehensive print and digital resources appropriate to all disciplines at the university, as well as aiding in managing the non-commodity information (data, print, other formats) produced by university researchers.
- The growth of the library staff should reflect the expertise needed to support faculty and student research and publication in all forms and disciplines.
- The library itself could be studied by researchers interested in organizational management, economics, educational outcomes, etc.
- The library should be a partner in research projects that would benefit from librarian input and expertise.

Library and Scholarly Communication Advisory Committee

We propose the establishment of a Senate standing committee, the Library and Scholarly Communication Advisory Committee (LSCAC). We believe that a free-standing LSCAC will best meet the needs of the campus, since the issues that such a committee will address are unique to this domain, and since the ex officio membership of this committee will not overlap with that of other standing committees. However, if it proves difficult to staff a free-standing LSCAC, we note that it would be feasible to make the LSCAC charge a part of the Committee on Research charge (as at UC Irvine, see Appendix A), presumably with the LSCAC a semi-autonomous subcommittee of CoR. We note further that LSCAC will generally need to meet only once or twice per semester.

The LSCAC will, of course, aid the library by serving as a two-way conduit for mutual exchanges of information and ideas between the library and its stakeholders. In keeping with such committees on other UC campuses, the committee will advise the Chancellor regarding administration of the Library, and, in accordance with the

Standing Orders of the Regents, advise the University Librarian regarding acquisition, storage and provision of library holdings; and to perform such other duties relative to the Library as may be committed to the Senate by proper authority. The committee will participate with the University Librarian in matters relating to the library budget, the formulation of library policies, the allocation of space, and the apportionment of funds; and will prepare and submit to the Division an annual report on financial problems, allocation of space, facilities for research, and any other matters within its jurisdiction. The LSCAC will also advise the library on matters of importance to the university community, and will liaise with the CIO on matters related to research computing. Finally, the LSCAC will study and report on issues of scholarly communication, including technology, publishing, teaching, archiving, and copyright. The LSCAC promotes education and advocacy for matters concerning the library and scholarly communication.

The proposed membership of the LSCAC is as follows:

Faculty member representing the Academic Senate Committee on Research
Faculty member representing School of Social Sciences, Humanities, and Arts
Faculty member representing School of Natural Sciences
Faculty member representing School of Engineering
Librarian representing the Librarians Association of the University of California—Merced Division
University Librarian (ex officio)
Vice Chancellor for Research (ex officio)
Chief Information Officer (ex officio)
Representative of the Graduate Student Association
Representative of the Associated Students of the University of California, Merced
Vice Provost and Dean of Undergraduate Education (ex officio)

APPENDIX A

University of California Library Advisory Structures

UC Berkeley

Library Committee

Membership:
This Committee has two student members (one graduate, one undergraduate); number of Senate members not specified. 2013-2014 Library Committee has 11 faculty members plus University Librarian "by invitation."

Charge:

- Advises the Chancellor regarding administration of the Library; and
- Performs such other duties relative to the Library as may be committed to the Division.

http://academic-senate.berkeley.edu/committees/libr

UC Davis

Library Committee

Membership:
This committee shall consist of at least ten members, including the following: one undergraduate student representative; one graduate student representative; one representative appointed by the Davis Academic Federation; the chair of the library committee of each college or school having a library committee on the Davis campus; a faculty member from each college or school on the Davis campus that does not have a library committee but does have a committee with responsibility for library matters; and the University Librarian of the Davis campus ex-officio. (Am. 3/16/92; 10/20/97)

Charge:
It shall be the duty of this committee to advise the Chief Campus Officer regarding the administration of the Library on the Davis campus, in accordance with the Standing Orders of the Regents, to advise the University Librarian regarding removal and storage of library holdings, and to perform such other duties relative to the Library as may be committed to the Senate by proper authority. The committee shall report at least once a year to the Representative Assembly. (Am. 6/10/93; effective 1/1/94)

http://academicsenate.ucdavis.edu/committees/committee-list/library.cfm

UC Irvine

Council on Research Computing and Libraries

Membership:
The Council on Research, Computing, and Libraries shall consist of at least one member

from each Faculty and no more than one member from any academic department. To balance the responsibilities of service among the members, each of the following Faculties shall have the following number of members:

1) Biological Sciences (2 members), Health Sciences (2 members);
2) Physical Sciences (2 members), Engineering (2 members), ICS (1 member);
3) The Arts (1 member), Humanities (2 members); Education (1 member); and
4) Social Sciences (2 members), Social Ecology (1 member), Business (1 member), Law (1 member).

The Vice Chancellor for Research, the Associate Vice Chancellor of Information Technology, and the University Librarian shall be ex officio non-voting members.

Charge:

(1) Consider issues pertaining to fostering research.
(2) Advise the Chancellor and represent the Division on matters relating to research policy and administration and academic resources, including information technology, telecommunications, and library policies and administration on the Irvine campus.
(3) Administer general campus funds for faculty research and review and evaluate University-recognized research programs and units.
(4) Advise the Vice Chancellor for Research on campus nominees or applicants for research awards from foundations and other granting agencies which restrict the number of proposals submitted.
(5) Represent the Division on the University Committee on Research Policy, the University Committee on Library & Scholarly Communication, and the University Committee on Computing & Communications
(6) A designated library representative shall be responsible for maintaining Council liaison with the University Librarian, and with any library committees that may exist in any of the Faculties.

Activities of CORCL should take into consideration the university's mission to promote diversity.

http://www.senate.uci.edu/Councils/CORCL/index.asp

UCLA

Committee on Library and Scholarly Communication

Membership:

Nine voting faculty appointed by the Committee on Committees and confirmed by the Legislative Assembly for up to 3 years,
The UCLA University Librarian, ex-officio,
Two student representatives, 1 undergraduate and 1 graduate appointed by their respective student government.

Charge:

The Committee on Library and Scholarly Communication (COLASC) takes, as its principal obligation, to reflect and articulate the views of UCLA faculty members concerning the role

of the University Library in the acquisition, storage, and provision of scholarly materials.

COLASC advises the Chancellor concerning the administration of the Library and scholarly communication. The Committee represents the Division and the faculty in all matters of library policy and advises the Library administration accordingly. COLASC meets twice per quarter

Interactions with Administration:
Primary interactions are with the University Librarian.

http://www.senate.ucla.edu/committees/library/

UC Riverside

Library & Scholarly Communication

Membership:
This committee consists of seven members of the Division, including the University librarian of the Riverside campus, ex officio. The Chair normally also serves on the University Library Committee.

Charge:
It is the duty of this committee to:

(1) Advise the President and the Chancellor regarding the administration of the library and matters concerning scholarly communication at Riverside in accordance with the Standing Orders of the Regents and perform such other duties relative to the library as may be referred by proper authority;
(2) Participate with the librarian in matters relating to the library budget, the formulation of library policies, the allocation of space, and the apportionment of funds;
(3) Provide liaison between the Faculty and the library administration in all matters of library policy;
(4) Prepare and submit to the Division an annual report on financial problems, allocation of space, facilities for research, and any other matters within its jurisdiction;
(5) Participate in an advisory capacity in the appointment of the librarian.

http://senate.ucr.edu/committee/?do=info&id=15

UC San Diego

Library

Membership:
This committee shall consist of seven ordinary members of the Division, including ex officio the University Librarian at San Di ego, who shall not become chair. It shall also have one representative of the Librarians Association of University of California, one undergraduate student representative, and one graduate student representative, who shall not have the right to vote. One member shall also serve on the University Library Committee.

Charge:
The Library Committee shall have the following duties:

(1) It shall advise the President of the University and the Chancellor at San Diego regarding the administration of the Library at San Diego [see 105.2(f) of the Standing Orders of The Regents]. Such advice shall include recommendations concerning the Library budget, the formulation of Library policies, the alloca tion of space, and the apportionment of funds.
(2) It shall perform such other duties relative to the Library at San Diego as may be committed to the Division by proper authority.
(3) It shall provide liaison between the faculty and the Library administration in all matters of Library policy.
(4) It shall prepare and submit to the Division an annual report on financial problems, allocation of space, facilities for research in campus libraries, and any other matters within its jurisdiction.
(5) It shall participate in an advisory capacity to the Chancellor at San Diego and the President of the University preliminary to the appointment of the University Librarian.

http://senate.ucsd.edu/committees/library.htm

UC San Francisco

Library & Scholarly Communication

Membership:
This Committee shall consist of ten members, including the University Librarian of the San Francisco Division, a representative of the Librarians Association of the University of California - San Francisco Division (LAUC-SF), and one representative from either the UCSF Graduate Student Association or Associated Students of the University of California, San Francisco as ex officio members. The student representative groups shall in alternate years provide representatives (in odd years – GSA, in even years – ASUCSF), with each group serving to coordinate and communicate matters of importance relative to the Library on behalf of both groups. In the event that the Student Associations are unable to alternate representation, they shall determine amongst themselves which organization will send representation.

Charge:

(1) To advise the President and the Chancellor regarding the administration of the library at San Francisco, in accordance with the Standing Orders of The Regents, and perform such duties relative to the Libraries at San Francisco as may be assigned to the Division by proper authority.
(2) To provide liaison between Faculty and Library Administration on all matters of library policy.
(3) To participate with the University Librarian on matters relating to library budget formulation policy and the allocation of space and apportionment of funds.
(4) To prepare and submit to the San Francisco Division an annual report on financial problems, allocation of space, facilities for Library research and any other matters within its jurisdiction.

http://senate.ucsf.edu/committee/index.php?committee_id=10

UC Santa Barbara

Committee on Library, Information, & Instructional Resources

(The Committee on Library, Information, & Instructional Resources functions as a subcommittee of the Council on Research and Instructional Resources.)

Membership:
Committee on Library, Information & Instructional Resources consisting of a Chair and five (5) Council members. The University Librarian and Associate Vice Chancellor of Academic Programs serve ex-officio;

Charge:
Acts for the Division in all matters of Library policy and administration and advises the Chancellor and the Division accordingly; reviews and makes recommendations concerning the print, electronic, space and growth needs of the Library; participates in administrative reviews of the Library and formulates recommendations to the Chancellor, the Division and the Council on Planning and Budget as appropriate.

https://senate.ucsb.edu/~councils.and.committees/index.cfm?V=F996622685347CB78BEC86C39837969D

UC Santa Cruz

Committee on the Library and Scholarly Communication

Membership:
There are five Santa Cruz Division members, plus the University Librarian at Santa Cruz serving ex officio. In addition, there are no more than two student representatives. The Chair and Chair-elect of the UCSC Librarians Association are invited to sit with the Committee. The University Librarian does not serve as Chair.

Charge:

1) The Committee advises the President of the University and the Chancellor at Santa Cruz regarding the administration of the libraries at Santa Cruz, in accordance with the Standing Orders of the Regents. It consults with campus and library administration on local and Universitywide library and scholarly communication policies. Scholarly communication refers to the modalities by which research and creative work are made public, as described in 13.23.4. Whenever appropriate, the Committee joins the library administration in providing representation at Universitywide discussions of library policy. It assists the library administration in determining acquisition and management policies for collections, considering changing patterns of faculty and student use of the library, and the varied needs of the different disciplines.
2) In consultation with the University Librarian, the Committee advises the Chancellor

and the Committee on Planning and Budget on the library budget, apportionment of funds, allocation of space, and other matters concerning the library. Advises and consults with the Chancellor on administrative reviews of the library.

3) The Committee studies and reports on issues of scholarly communication, including technology, publishing, teaching, archiving, and copyright. The Committee promotes education and advocacy for matters concerning the library and scholarly communication.

http://senate.ucsc.edu/committees/colasc-committee-on-library-and-scolarly-communication/index.html

California Digital Library

Systemwide Library and Scholarly Information Committee

The Systemwide Library and Scholarly Information Committee was established to advise the University on systemwide library policies and strategic priorities, on systemwide long term planning for the UC libraries including the ten campus libraries and the California Digital Library (CDL), and on strategies to enhance and facilitate the transmission of scholarly and scientific communication in a digital environment.

SLASIAC Membership and Charge:
http://libraries.universityofcalifornia.edu/groups/files/slasiac/docs/SLASIAC_charge_revised_final_111411.pdf

http://libraries.universityofcalifornia.edu/slasiac

COMMITTEE ON RESEARCH (COR)
ANNUAL REPORT
AY 2014-2015

To the Merced Division of the Academic Senate:

The Committee on Research (COR) held a total of 16 regularly scheduled in-person meetings in order to conduct business with respect to its duties as outlined in UC Merced's Senate Bylaw II.III.7. Some additional business was completed via electronic mail discussions.

Annual Goals and Areas of Focus

In the first meeting of fall semester, COR members outlined seven overarching goals for the committee to pursue throughout the academic year. They also identified committee members who would play leadership roles for each of these issues. The seven general goals were:

1) *Improve and administer the Academic Senate annual faculty research grants program.* Of the responsibilities of COR, administering the faculty research grants program has historically required the most attention and labor, and this task is seen as an important contribution of the committee. The committee devoted a portion of each meeting, this year, to discussing ways to improve the program and the processes leading to the competitive assignment of awards. COR had previously submitted two memos to Division Council clearly stating the need for an increase in funding from the Provost/EVC for this program, as funding had not increased commensurate with the growth in faculty numbers. In recent years, many meritorious proposals had not been funded due to the low levels of available funding. In the absence of additional funds from the Provost/EVC, COR worked to reevaluate the criteria used to evaluate grant proposals, focusing on (i) the criteria that would allow the program to have the maximum impact on campus research productivity, (ii) improving consistency and fairness in the proposal assessment process, and (iii) managing the large labor load, both on the part of the committee members and also on faculty members recruited to conduct ad hoc reviews, of the evaluation process.

2) *Prepare for the formal review of campus research units.* Since the Senate approved the policies drafted by the AY 2013-2014 COR membership on the establishment and review of research units, COR focused on beginning the implementation of those policies during AY 2014-2015. The Sierra Nevada Research Institute (SNRI) was scheduled for a five-year review, and COR planned to collaborate with ex-officio committee member Vice Chancellor for Research and Economic Development (VCORED) Sam Traina to launch this endeavor and evaluate SNRI's research contribution to the campus. While the review process was clarified by early planning, the actual review of SNRI was postponed until AY 2015-2016.

3) *Advocate for a robust indirect cost return policy for extramural funding and monitor the efforts of the administration to implement such a policy.* COR identified its role as that of imparting to the administration the importance of faculty bridge funding, as well as consistency and transparency in any indirect cost return policy. COR also made plans to work with the administration to clearly communicate to the campus faculty any and all changes to indirect cost return processes.

4) *Monitor laboratory safety policy issues.* The move of faculty research laboratories from the Science & Engineering 1 building to the Science & Engineering 2 building introduced new issues concerning the need to ensure both the safety and efficient functionality of campus laboratories. These issues are varied and complex, and it is expected that they will persist for at least the next few years. VCORED Traina co-chairs a campus research safety committee with faculty representation, and COR continued to monitor and advise on associated safety issues.

5) *Provide advice concerning a new grants management system and campus responses to associated federal research guidelines.* COR planned to assist the VCORED, Research and Development Services (RDS), and the Sponsored Projects Office (SPO) by providing guidance on a new system for lifecycle grants management before its scheduled deployment in 2015. The COR membership was in a good position to comment on training materials and other components of the new system.

6) *Monitor research space allocation decisions and decision-making procedures.* COR planned to work with other Senate committees, including CAPRA, in order to advise the administration on space issues as they affect the campus research mission. Various

space committees have been convened over time, but COR recognized a pressing need for more faculty representation on these committees.

7) *Provide guidance concerning limited submission grant proposals.* Decisions concerning the selection of extramural funding proposals in cases where only a limited number of proposals are allowed from each campus have been mostly handled by School level decision-making bodies and rapidly convened ad hoc committees at the campus level. COR intended to offer recommendations on the review process, focusing on the need for consistency and transparency.

While COR conducted regular Senate business throughout the year, these seven issues served to guide the direction of much of the committee's work.

Annual Academic Senate Faculty Research and Travel Grants

A Case for Increased Funding

COR conducted lengthy discussions on the impact of static funding for the faculty research grants program on the committee's ability to allocate awards in a manner that optimally supports the research goals of the campus. In order to build a compelling case to the Provost/EVC for increased funding, COR conducted a survey of faculty research grant awardees from the past five years, asking faculty members to describe how their awards impacted their research in terms of publications, research presentations, related competitive grant awards, students supported, and new collaborations formed. COR summarized the results of this survey and submitted a memo to the Provost/EVC in spring 2015, requesting that funding for this program track growth in faculty numbers.

The poll revealed that, from the 35 responses received, these awards have led to at least 20 extramural grants, 54 publications, 46 presentations, support for 23 graduate students, and the creation of 16 new collaborations. As one of the only internal competitive research awards on campus, COR asserted that this grants program needed to be bolstered to support interim and bridge funding, maintenance of research capabilities, the initiation of collaborative and interdisciplinary work, the support of fields lacking sources of extramural funding, and a sense that the administration is committed to expand research activities on the campus as it grows. COR asked the Provost/EVC to consider increasing funding to a per capita level equal to that at the

time of the program's inception (i.e., $1,000 per Senate faculty member), or $159,000, as well as committing to the maintenance of this funding level as the campus grows.

Revised Process for the Evaluation of Proposals

In addition to being underfunded, the faculty research grants program has consistently suffered from problems with the proposal evaluation process. These problems generally have involved the labor needed to review proposals, both in terms of quantity and in terms of qualifications. Recruiting campus faculty to volunteer their time to evaluate proposals has been met with an abundance of polite refusals, and the relatively small size of the campus has introduced a large number of conflict-of-interest situations, restricting the potential pool of reviewers further. Past efforts to shift the bulk of the evaluation workload to the COR membership has produced an unmanageable labor burden, and this approach has greatly limited the expertise brought to bear on the proposal assessment process. The AY 2014-2015 COR membership deliberated extensively on these problems, searching for evaluation methods that might improve on those used during previous years.

COR made two major modifications to the proposal assessment process. First, it introduced a standardized cover sheet for proposals, motivated by a desire to ensure that all proposals provided a common array of basic information. Second, in an effort to introduce more relevant expertise into the evaluation process, COR required each proposal to identify an originating School, and faculty Executive Committees of the Schools were asked to formulate strategies for rating their subset of the proposals, leveraging the expertise of their faculty as much as possible. Given the quality ratings provided by the Schools, COR would merge proposal rankings based only on general and fairly objective criteria, reflecting the goals of the funding program, such as faculty juniority, time since last award, availability of alternative funds, and the presentation of explicit and detailed plans for the pursuit of further extramural funding. The idea was to "outsource" quality assessment to the expertise found in the Schools and to make any remaining criteria clear and transparent.

A call for proposals, providing extensive information concerning the new procedures, was delivered to all Senate faculty members in March 2015. At its May 6 meeting, COR members conducted their final deliberations, and selected awardees were notified shortly thereafter.

While informal positive feedback was received from the faculty concerning the procedural changes that were made to the evaluation process, two major concerns were raised and communicated to COR.

First, the fact that COR members were allowed to participate in the program as proposal authors was seen as problematic. It is worth noting that this aspect of the process was unchanged from previous years. Furthermore, COR deliberations included a number of mechanisms to protect the ranking process from conflicts of interest. COR members were certainly not allowed to rate properties of proposals (e.g., the degree to which a plan to obtain extramural funding appeared in a proposal) or comment on proposals in any way whenever there was a conflict of interest, which included both authorship and close collaboration with authors. Also, proposal authors on COR were not allowed to see the property ratings provided by other committee members, reducing the risk of introducing some form of implicit collusion bias. In the end, very few proposals were discussed by the COR membership directly, with almost all deliberation focusing on the appropriate weighting of previously established criteria.

The second problem involved the unintended result of producing a proposal ranking that left humanities proposals without funding. The COR membership had recognized the desirability of using this funding program to support research in fields for which there are limited opportunities for extramural funding. Rather than explicitly identifying those fields, however, the COR membership opted to directly evaluate the degree to which a proposal made a case that extramural funding was unavailable for the proposed project. When combined with other criteria, this raised the ranking of both humanities proposals and some of the social science proposals, but, in the end, the humanities proposals still fell below the threshold introduced by the small size of the program fund. Based on this experience, there is reason to suspect that the goal of using this program to support humanities research will only be met by segregating humanities proposals from others, introducing separate evaluation criteria and, perhaps, pre-allocating a proportion of the program funds to supporting research of this kind.

Finally, it is worth noting that some faculty expressed the opinion that the expertise of School faculty was still insufficiently specific to consistently evaluate the quality of proposals. Given that COR has neither the financial resources nor the labor resources needed to recruit ad hoc reviewers in specific research areas from off campus, and given

that such reviews would still leave the problem of comparing proposals from disparate research areas during the final ranking process, these comments suggest that efforts to produce reliable proposal quality estimates may be futile. In the future, COR may need to choose between a process that is clearly fair and a process that continues to heavily weight some measure of proposal quality.

Indirect Cost Return

During AY 2013-2104, COR drafted a proposed indirect cost return model and submitted it to Vice Chancellor for Business & Administrative Services Michael Reese and Vice Chancellor for Planning & Budget Dan Feitelberg. Both VCs attended a COR meeting at which COR members stressed the faculty's critical need for discretionary research funds, such that the implementation of a considered plan to reallocate unused faculty start-up funds to non-research related purposes would greatly hinder the research mission of the campus unless an equivalent amount of money was cycled back into the campus research enterprise. It was explained that many faculty members keep their start-up funds unspent for an extended period of time due to the lack of other sources of laboratory/unit/departmental unrestricted funding. Moreover, while the Senate continues to maintain its annual faculty research grants program, the amount of funding allocated to this program by the Provost/EVC has not risen in proportion to the growth in faculty numbers. Another meeting was held in August 2014 with COR members, VC Reese and Feitelberg, VCORED Traina, incoming Controller Michael Riley, and incoming AVC for Finance Donna Jones.

Due to scheduling difficulties, the first meeting of the AY 2014-2015 COR membership with representatives of the administration on this topic was held in March 2015. At that time, COR met with VC Reese, AVC Jones, and Director of Accounting Services Kimberly Groesbeck. COR emphasized the faculty's concern about start-up funds, given the lack of departmental or other bridge funding available for emergency expenditures. VC Reese announced that an indirect cost return proposal had been presented to the Chancellor for her approval. If approved, the model would be implemented on July 1, 2015. The proposed model would stipulate 5% of indirect costs to be returned to faculty member PIs and Co-PIs, but only on grants that pay full indirect costs. This return would occur in arrears, and the policy would be implemented by the Office of Research and Economic Development. Another 5% would be allocated to the School Deans.

COR members provided the following suggestions with regard to the proposed model: 1) language should be added in the proposal clarifying that the funds allocated to the Deans are to be set aside for faculty research purposes; 2) the proposal should specify that the 5% for Deans should be used to benefit the research group of the PIs and Co-PIs, in preference to other faculty members in the School; 3) there should be greater decentralization of control over the funds, perhaps by distributing them to the graduate group and bylaw 55 unit chairs, and 4) funds should be allocated to the ORUs, when appropriate.

New Grants Management System

RDS Director Susan Carter and her staff were guests at a COR meeting this year to present information concerning a new electronic grants management system. A draft timeline for the grant submission process, meant to act as a guide for faculty, was also presented to COR and feedback was requested. The two-part management system is intended to provide a more efficient process for faculty members and to generate internal data for reporting to UCOP. RDS piloted the system with the School of Natural Sciences in early spring 2015. While COR ultimately decided to postpone providing detailed feedback on the system until later in 2015, when the pilot period concluded and the faculty could be polled, the committee nonetheless appreciated the RDS consultation

Creation of Library and Scholarly Communication Committee

During AY 2013-2014, the Senate-Administrative Library Working Group recommended the creation of a standing Senate committee on library and scholarly communication. The monitoring of library issues was one of COR's charges, but it became increasingly clear that this responsibility was poorly situated, as supporting research activities is only one part of the library's mission. COR held that issues involving both undergraduate and graduate education, as well as the intelligent allocation of limited campus resources (including space), should also influence the guidance provided by the Senate to the administration concerning the campus library.

In fall 2014, COR urged Division Council to approve the empaneling of a standing Senate committee on library and scholarly communication. The request had the widespread support of other Senate committees. At Division Council's request, COR

drafted proposed bylaws for the committee and proposed membership that draws on expertise from existing standing committees, allowing input from the perspective of resource allocation (CAPRA), support for research (COR), support for graduate education (GC), and support for undergraduate education (UGC).

In spring 2015, Division Council approved the creation of the standing Senate Committee on Library and Scholarly Communication (LASC). As this would require a revision of the UC Merced Bylaws, this item was included for discussion on the agenda for the spring Meeting of the Division and presented by the Chair of the Senate Committee on Rules & Elections (CRE). Following the Meeting of the Division, the campus faculty approved the revised Bylaws and the creation of LASC via electronic vote. The new committee will convene in AY 2015-2016.

Consultation and Monitoring

Consultation with VCORED

Throughout the academic year, COR members benefited from updates on various research-related issues from VCORED Traina, an ex-officio committee member. Major topics of consultation between COR and the VCORED included clarifying the campus limited submission process, issues about laboratory safety, and the establishment and review of ORUs. The VCORED also provided updates to COR throughout the year on discussion topics at the Council of Vice Chancellors.

Consultation with Assistant Vice Chancellor for Research and Economic Development

The Office of Research was restructured to include a new division entitled the Office of Business Development. This new office is led by AVC Peter Shuerman, who, at the invitation of the committee, attended a COR meeting to provide an overview of his office's services. AVC Shuerman's staff works on projects related to start-up companies and is introducing a development element by seeking partnerships, shared opportunities, and strategies for obtaining return on investment. The campus has acquired office space downtown to begin building teams in support of these business partnerships. Both AVC Shuerman and VCORED Traina reiterated the importance of partnerships and pointed out that the support for faculty research and the exploration of inventions could be had through careful integration with a business model.

Vice Chair Updates on PROC

COR benefited from updates from its Vice Chair who, by virtue of this position, serves on the Program Review Oversight Committee (PROC). The Vice Chair reported the following major items of discussion in PROC: the VCORED's procedures on the review of ORUs and the need for a standardized review process across campus.

Provost/EVC's Proposed Six-Year Ladder-Rank Faculty Hiring Plan

The Provost/EVC's Strategic Academic Focusing (SAF) process, begun in AY 2013-2014, resulted in the Provost/EVC identifying five strategic areas ("pillars") that would receive resources and faculty FTE lines. In spring 2015, the Provost/EVC issued his six-year ladder-rank faculty hiring plan to the campus. Many faculty members expressed their concern to Senate committees over the future growth of traditional disciplinary ("foundational") areas. As this plan was discussed across campus over time, COR repeatedly returned to this topic in order to assess the implications of the evolving plan for the campus research mission.

Campus Review Items

- MAPP. As per policy, in the spring semester the Academic Personnel office, in conjunction with the Provost/EVC, submitted a set of proposed revisions to the *UC Merced Academic Personnel Policies and Procedures* (MAPP) document. This year's proposed revisions largely pertained to the L(P)SOE titles.
- Campus Climate Action Plan. COR reviewed the campus climate action plan drafted by the Chancellor's office in response to the March 2014 campus climate survey. COR requested that the plan include pointed action items focused on improving research support and infrastructure, as the lack thereof is one of the main reasons for faculty attrition. COR also suggested that the plan indicate the individuals or organizations who will be responsible for implementing the proposed actions.
- CAPRA's Space Principles Document. CAPRA drafted a statement of space principles for Senate committee review and campus distribution. COR agreed with the principles but suggested that space for visiting scholars and research academic visitors should also be planned at an appropriate ratio.
- Split of FWDAF into Two Committees: 1) Faculty Welfare and Academic Freedom and 2) Diversity and Equity. COR endorsed the proposed split.

- Project 2020. COR, along with other standing Senate committees, heard updates and provided input on Project 2020 issues, including allocations of assignable square feet for research space.
- PhD Program Proposals.
    - Economics. COR endorsed the proposal but had several concerns, including the proposal's projected growth rate of faculty and graduate students, whether proposed interdisciplinary research and coursework for graduate students is viable, library resources, demand for the program, and issues surrounding the proposed curriculum. In spring 2015, COR reviewed the revised proposal, noted the inclusion of the previously requested changes, and offered its endorsement pending one minor revision.
    - Mechanical Engineering. COR reviewed the proposal in the last academic year and had numerous concerns, including growth in faculty numbers, the roles of core versus associated faculty, and how the program intends to become one of the core research areas on campus. In summer 2015, COR was given the opportunity to review the revised proposal and offered no further comments.
    - Management of Innovation, Sustainability, and Technology. COR endorsed the proposal but had several concerns, including the location of the proposed FTE lines, student demand for the program and career opportunities, and the availability of teaching assistantships and potential availability of extramural funding for graduate support.
    - Public Health. COR endorsed the proposal but had several concerns, including the current funding situation of participating faculty (needed to assess the probability that available resources will grow commensurate with graduate student enrollment), support for additional FTE lines, specifying the research facilities necessary for the program, and student demand and career opportunities.
- Revised Proposal for a SSHA Minor in Community Research and Service. While COR asserted that this minor would be beneficial to students, the committee echoed UGC's concerns about faculty teaching credit and resources. While the revised proposal intended to address these concerns, COR was not convinced that issues concerning sustainability with regard to resources were resolved by

this modified proposal. COR pointed out that the revised proposal's plan to offer unrestricted faculty research support stipends to faculty who deliver relevant community-based research experiences may be in violation of APM 662-16, if those stipends may be taken as additional compensation.

- Proposal for a SSHA Major in Global Arts Studies Program (GASP). COR deemed the research implications to be acceptable and, therefore, had no comments.
- Proposed Pilot Program for Undergraduate Chairs in SNS and SSHA. COR deemed the research implications to be acceptable and, therefore, had no comments.
- Proposal to Establish a Public Health Bylaw 55 Unit in SSHA. COR endorsed the proposal but requested the following revisions: 1) the proposal would benefit from including letters of support from Deans and representatives of graduate groups, indicating that SSHA is an appropriate home for this program and 2) the proposal should remove the language that states that the unit will manage a graduate degree program, as this is not in the standard purview of a Bylaw 55 Unit at UCM.
- Provost/EVC's Proposed Procedures for the Establishment of Centers. COR was concerned that the document did not recognize that the Senate had previously approved policies, created in conjunction with administrative consultation, that specify procedures for the establishment and review of Centralized Research Units (CRUs), which appear to be essentially identical to the Centers described in the document under review. COR requested that the Provost/EVC frame his document as proposed revisions to these previously approved policies, so the Senate and Administration can establish one unified policy for research groups of this kind.
- VCORED's ORU Review Policy. The VCORED expanded on the set of comprehensive policies concerning the establishment and review of research units. The general policies were drafted and approved during AY 2013-2014, but the VCORED's document provided additional procedural details. COR endorsed the VCORED's policy, finding that it aligns with the Senate's established policies on the topic.

- SPO Director Search. VCORED asked for COR's participation in the search to replace the retiring SPO Director in 2015. COR was also asked for general input concerning potential future directions for SPO.
- COR formed subcommittees to review nominations and select winners for the two Senate awards under the Committee's purview: Distinction in Research (tenured) and Distinguished Early Career (untenured) Research.
- Two members of COR served on the Hellman Awards review committee, chaired by the Provost/EVC.

Systemwide Review Items

- APM Revisions. COR opined on several proposed revisions to various sections of the APM, as requested by systemwide and Division Council.
- Systemwide Senate Bylaws. COR reviewed two proposed revisions to the Senate Bylaws, one pertaining to the expanded role of the University Committee on International Education and the other focusing on making the vice chairs of all standing systemwide committees be at-large members.
- Copyright and Fair Use Policy. COR found that the proposed revisions did not indicate who is responsible for the contents of the web site contained in the policy, and it recommended that the procedures, or at least guidelines for procedures, should appear in the policy document rather that solely on the website.
- Proposals for Doctoral Student Support. COR recognized that the establishment of mechanisms that remove (or, at least, reduce) the cost of non-resident supplemental tuition (NRST) to extramural grants would generally make the cost of having an international graduate student much lower. This could have a substantial impact on the research productivity of faculty members by saving them substantial funds, and those funds could be allocated to cover other costs. However, waiving NRST only for internally funded students would produce a disincentive to fund international students on extramural grants. COR, therefore, recommended the adoption of a unified and equitable policy for all doctoral students.
- Guidelines on Accepting and Managing Equity in Return for Access to University Facilities and/or Services. COR pointed out that the document failed to indicate the responsible party for determining whether a given business

affiliation advances the UC's educational objectives. There was also no indication of which individual or body would adjudicate any conflict of interest. Finally, COR noted that the proposed policy does not provide for Senate oversight and, so, recommended that an annual report be submitted to the Senate each year.

- Proposal for Open Access for Non-Senate Members. COR endorsed the proposal.
- University Committee on Research Policy (UCORP) Updates. UCORP discussed the following major issues this academic year: funding for the multi-campus research programs and initiatives based on recommendations from the Portfolio Review Group, UC President Napolitano's formation of an Innovation Council, multi-million dollar investment into an initiative to commercialize UC research products, state budget negotiations between the Governor and President Napolitano, funding challenges for the UC Natural Reserve System, the UC Lab Fees Research Program, the future of the UC Division of Agriculture and Natural Resources, and general issues surrounding technology transfer.
- University Committee on Library and Scholarly Communications (UCOLASC) Updates. UCOLASC discussed the following major issues this academic year: the open access policy and the UC Copyright and Fair Use Policy.

Respectfully submitted:

COR members:
David C. Noelle, Chair (SSHA) – UCORP representative
Deborah Wiebe, Vice Chair (SSHA) – UCOLASC representative
YangQuan Chen (SOE)
Jason Hein (SNS)
Masashi Kitazawa (SNS)

Ex officio, non-voting members:
Sam Traina, Vice Chancellor for Research and Economic Development

Staff:
Simrin Takhar