FALL 2011
ORGANIZED RESEARCH
UNITS
DIRECTORS MEETING

October 25, 2011
3pm-5pm
111A University Center
ORU DIRECTORS MEETING AGENDA

3:00-3:10 Networking and Refreshments
3:10-3:15 Opening Remarks - Vice Chancellor Brown/AVC Tynan
3:15-4:00 ORU Presentations:
   a) Institute of Engineering in Medicine – Shu Chien
   b) Center for Human Development – Terry Jernigan
   c) CALIT2 – Ramesh Rao
4:00-4:10 New SDSC Services (Cloud Storage) – Mike Norman
4:10-4:25 Research Updates – ORA
4:25-4:35 FY2011-2012 Campus Workgroups (Budget Review Workgroup, Funding Streams Initiative) – Marianne Generales
4:35-4:55 Roundtable – All
4:55-5:00 Closing Remarks
2010-2011: UCSD TOTAL $960 MILLION

Awards by Campus Area, by Academic Unit

- Engineering: $77 million
- Physical Sciences: $51 million
- Social Sciences: $13 million
- Interdisciplinary ORUs: $110 million
- Other: $22 million

17 ORUs/2 MRUs + 2 in Process

1/3 IDC
CONGRATULATIONS!!!!!!!!!!

Dr. Shu Chien receiving the National Medal of Science
UCSD
Institute of Engineering in Medicine (IEM)

Director: Shu Chien, Prof. Bioengineering & Medicine
Associate Directors:
  David Cheresh, Prof. Pathology & Moores Cancer Center
  Shankar Subramaniam: Prof. Bioengineering

ORU Directors Meeting
October 25, 2011
Mission of
The Institute of Engineering in Medicine

• To accelerate **discoveries** of novel science and technology **through teamwork** interfacing engineering and biomedical principles and technologies.

• To facilitate the **translation** of innovative technologies **to improve healthcare** delivery through clinical application and commercialization.
### Translation of Science and Technology to Diagnose, Treat and Prevent Diseases

<table>
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<th>Technologies</th>
<th>Scientific Foundations</th>
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<tbody>
<tr>
<td>Imaging</td>
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<tr>
<td>Nanotechnology</td>
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<tr>
<td>Phenotyping Genotyping</td>
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<tr>
<td>Medical Devices</td>
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</tbody>
</table>

**Diseases**
- Cancer
- Cardiovascular Diseases
- Neuro-ophthalmological Diseases
- Orthopaedic Diseases
- Metabolic Disorders
- Other Diseases
Centers in the IEM

- **Cardiac Biomedical Science & Engineering:**
  Kirk Knowlton, Sylvia Evans, and Andrew McCulloch

- **Musculoskeletal Research:**
  Richard Lieber and Robert Sah
Centers in the IEM

• **Neurological Engineering:**
  William Mobley and T.P. Jung

• **Retina Engineering:**
  William Freeman and Gabriel Silva
Centers in the IEM

- Medical Device and Instrumentation
  Juan Lasheras & Mark Talamini
Centers in the IEM

• Whitaker Center for Biomedical Engineering
  John Watson
The Siebel Scholars Program

In 2009, the Siebel Scholars program was formed for Biomedical Engineering. UCSD and Johns Hopkins University were selected as recipients of the new BME Scholars Awards.

The $2-million endowment to the IEM and JSOE of UCSD will allow the funding of five Ph.D. students in their last year of bioengineering study at $35,000 each to be used at the students’ discretion.

Five outstanding awardees were selected each year in 2009, 2010, and 2011.
Von Liebig Center for Entrepreneurism

Rosibel Ochoa; John Watson

Accelerate commercialization of IEM Discoveries

**Discoveries (IEM)**
- Faculty
- Graduate Students

**Learning**
- vLC courses
- Biodesign
- BioBusiness

**Commercialization Interns**
- von Liebig Advisors
- Technology assessment
- Market research
- Opportunity analysis

**PROJECT MANAGEMENT TEAM**
- Technology Development and Commercialization Strategy
- Proof of Concept Grants
- Partnership Opportunities
- Additional Research

Technology Transfer Office
CONNECT, BIOCOM, etc.

Clinical Translation Research Institute (CTRI)
Collaborations with Other Centers

- California Institute of Telecommunication and Information Technology (Calit)
- San Diego Supercomputer Center (SDSC)
- Clinical and Translational Research Institute (CTRI)
- Sanford Consortium of Regenerative Medicine
  \[Sanford-Burnham, Salk, Scripps, UCSD\]
Interactions with Clinical Programs

- Moores Cancer Center
- Sulpizio Family Cardiovascular Center
- Shiley Eye Center
- Hospitals: Hillcrest, Thornton, VA Medical Center
WCBE – Industrial Advisory Board members

- Amylin Pharmaceuticals
- BD Biosciences
- Biogen Idec, Inc.
- Biomatrica, Inc.
- BioMedical Strategies LLC
- Breg, Inc.
- Cadence Pharmaceuticals
- Centocor R&D
- Genentech
- Genomatica Inc.
- GT Lifesciences
- Halozyne Therapeutics
- Innercool Therapies, Inc.
- Life Technologies (Invitrogen)
- Medtronic, Inc.
- NuVasive, Inc.
- Pfizer
- Sigmed
- Synthasome, Inc.
- Tecellact LLC
- Verenium Corporation
UC System-wide

Bioengineering Institute of California (BIC)

Annual Symposium since 2000

10 Campuses United as One

Learning & Growing Together

13th Annual Symposium
June 21-23, 2011 UC Berkeley

UCB

1st & 11th Annual Symposium
2001 & 2011 UC Davis

UCD

12th Annual Symposium
June 15-17, 2011 UCSB

UCSB

UCSF

1st & 11th Annual Symposium
2001 & 2011 UC Davis

UCM

UCSD

BIC Headquarter

UCR

UCI

UCLA
International Cooperation

- **China**  Peking Univ., JiaoTung Univ., Tsinghua Univ., Huazong Univ. Sci. & Tech., Chongqing Univ.
- **Germany**  Eberhard Karls Univ. Tübingen, Fraunhofer Inst. Interfacial Engineering & Biotechnology, Stuttgart
- **Singapore**  Nat. Singapore Univ., Nanyang Tech.l Univ.
- **Spain**  Prince Carlos III Univ.
- **Sweden**  Gothenburg Univ.
- **Taiwan**  Academia Sinica, National Health Research Inst., National Taiwan Univ., Univ. System of Taiwan
- **UK**  Imperial College, Kings College London, Oxford Univ., Sheffield Univ.
- **UAE**  Khalifa Univ.
Thank You!
Mission Statement

The Center for Human Development is constituted as an organized research unit of the University of California, San Diego.

- The CHD provides core resources for the community of scholars and investigators throughout the university with research interests in human development, broadly defined.
- Among the resources available are testing and meeting facilities, administrative and research offices, a centralized web-accessible database and participant registry, pre- and post-award support for contracts and grants, and core support for clinical behavioral assessments, neuroimaging and neurophysiological studies, and statistical and computational modeling.
- In addition to its research activities, the CHD sponsors and supports seminars and workshops to promote intellectual exchange among developmental scholars, and it contributes to the education of undergraduates, graduates, and postdoctoral fellows with interests in developmental sciences.
Director

Terry Jernigan, Department of Cognitive Science

Executive Committee

Farrell Ackerman, Department of Linguistics
Leslie Carver, Department of Psychology
Christina Chambers, Department of Pediatrics
Michael Cole, Department of Communication
Sarah Creel, Department of Cognitive Science
Gedeon Deák, Department of Cognitive Science
Gail Heyman, Department of Psychology
David Liu, Department of Psychology
Nicholas Spitzer, Department of Biology
Expenditures (Direct Cost EMF vs. Core Funds) by Fiscal Year

- **n = number of active awards in CHD**
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<th>INVESTIGATOR</th>
<th>INSTITUTION</th>
<th>DEPARTMENT</th>
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<tr>
<td>Natacha Akshoomoff, Ph.D.</td>
<td>UC San Diego</td>
<td>Psychiatry</td>
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<tr>
<td>Mark Appelbaum, Ph.D.</td>
<td>UC San Diego</td>
<td>Psychology</td>
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<tr>
<td>Tim Brown, Ph.D.</td>
<td>UC San Diego</td>
<td>Neurosciences</td>
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<tr>
<td>Ruth Carper, Ph.D.</td>
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<td>Anders Dale, Ph.D.</td>
<td>UC San Diego</td>
<td>Neurosciences, Radiology</td>
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<tr>
<td>Rosalind Dietrich, M.D.</td>
<td>UC San Diego</td>
<td>Radiology</td>
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<tr>
<td>Jeng-Ren Duann, Ph.D.</td>
<td>UC San Diego</td>
<td>Institute for Neural Computation</td>
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<tr>
<td>Anthony Gamst, Ph.D.</td>
<td>UC San Diego</td>
<td>Family and Preventive Medicine</td>
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<tr>
<td>Frank Haist, Ph.D.</td>
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<td>Psychiatry</td>
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<tr>
<td>John Hesselink, M.D.</td>
<td>UC San Diego</td>
<td>Radiology, Neurosciences</td>
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<tr>
<td>Terry Jernigan, Ph.D.</td>
<td>UC San Diego</td>
<td>Cognitive Science, Psychiatry, Radiology</td>
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<tr>
<td>Josh Kuperman, Ph.D.</td>
<td>UC San Diego</td>
<td>Radiology</td>
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<tr>
<td>David Liu, Ph.D.</td>
<td>UC San Diego</td>
<td>Psychology</td>
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<tr>
<td>Joan Stiles, Ph.D.</td>
<td>UC San Diego</td>
<td>Cognitive Science</td>
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<td>Wes Thompson, Ph.D.</td>
<td>UC San Diego</td>
<td>Psychiatry</td>
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<td>Jeanne Townsend, Ph.D.</td>
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<td>Doris Trauner, M.D.</td>
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<tr>
<td>Marissa Westerfield, Ph.D.</td>
<td>UC San Diego</td>
<td>Neurosciences</td>
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<tr>
<td>David Amaral, Ph.D.</td>
<td>UC Davis</td>
<td>Psychiatry and Behavioral Sciences</td>
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<tr>
<td>Janette Atkinson, Ph.D.</td>
<td>University College London</td>
<td>Psychology</td>
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<tr>
<td>Cinnamon Bloss, Ph.D.</td>
<td>The Scripps Research Institute</td>
<td>Genomic Medicine</td>
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<tr>
<td>Susan Bookheimer, Ph.D.</td>
<td>UCLA</td>
<td>Psychiatry and BioBehavioral Sciences</td>
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<tr>
<td>Oliver Braddock, Ph.D.</td>
<td>University of Oxford</td>
<td>Experimental Psychology</td>
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<td>Michael Buonocore, M.D., Ph.D.</td>
<td>UC Davis</td>
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<td>Peter C.M. van Zijl, Ph.D.</td>
<td>Johns Hopkins University</td>
<td>Radiology, Biophysics</td>
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<tr>
<td>BJ Casey, Ph.D.</td>
<td>Sackler Institute</td>
<td>Developmental Psychobiology</td>
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<tr>
<td>Linda Chang, M.D.</td>
<td>University of Hawaii at Manoa</td>
<td>Medicine, Division of Neurology</td>
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<tr>
<td>Thomas Ernst, Ph.D.</td>
<td>University of Hawaii at Manoa</td>
<td>Medicine</td>
</tr>
<tr>
<td>Jean Frazier, M.D.</td>
<td>University of Massachusetts</td>
<td>Psychiatry and Pediatrics</td>
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<tr>
<td>Ellen Grant, M.D.</td>
<td>Harvard Medical School</td>
<td>Radiology</td>
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<tr>
<td>Jeffrey Gruen, M.D.</td>
<td>Yale University</td>
<td>Pediatrics, Genetics, Investigative Medicine</td>
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<tr>
<td>Martha Herbert, M.D., Ph.D.</td>
<td>Harvard Medical School</td>
<td>Neurology</td>
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<tr>
<td>Walter Kaufmann, M.D.</td>
<td>Johns Hopkins University</td>
<td>Pathology, Neurology, Pediatrics, Psychiatry, Radiology</td>
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<tr>
<td>Tal Kenet, Ph.D.</td>
<td>Massachusetts General Hospital</td>
<td>Neurology</td>
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<td>David Kennedy, Ph.D.</td>
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<td>Kang Lee, Ph.D.</td>
<td>University of Toronto</td>
<td>Human Development and Applied Psychology</td>
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<tr>
<td>Alan Lincoln, Ph.D.</td>
<td>Alliant International University</td>
<td>Clinical Psychology</td>
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<tr>
<td>Sarah Murray, Ph.D.</td>
<td>The Scripps Research Institute</td>
<td>Translational Genomics</td>
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<tr>
<td>Judy Reilly, Ph.D.</td>
<td>San Diego State University</td>
<td>Psychology</td>
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<tr>
<td>Bruce Rosen, M.D., Ph.D.</td>
<td>Harvard Medical School</td>
<td>Radiology</td>
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<tr>
<td>Nicholas Schork, Ph.D.</td>
<td>The Scripps Research Institute</td>
<td>Molecular and Experimental Medicine</td>
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<tr>
<td>Elizabeth Sowell, Ph.D.</td>
<td>UCLA</td>
<td>Neurology</td>
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<tr>
<td>Paula Tallal, Ph.D.</td>
<td>Rutgers University</td>
<td>Neuroscience; Molecular and Behavioral Neuroscience</td>
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<tr>
<td>Jay Tian, Ph.D.</td>
<td>Chinese Academy of Sciences</td>
<td>Institute of Automation</td>
</tr>
<tr>
<td>Andre van der Kouwe, Ph.D.</td>
<td>Massachusetts General Hospital</td>
<td>Physics, Radiology</td>
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“Creating a Pediatric Imaging Genomics Data Resource”

- Sites: UCSD, UCLA, UCD, U Hawaii, Hopkins, U Mass, MGH, Cornell, Yale
- 1400 typically developing children, aged 3 – 20 years
- Developmental & Family History Questionnaire
- NIH Toolbox Cognitive Assessment
- sMRI, HARDI, rs fMRI
- Saliva samples for genotyping
- PhenX Toolkit: substance use, affect, and risk behavior assessments (NHGRI Administrative Supplement)
Meet the Neural Phenotypes

Subcortical Segmentation
- ROI Volumes

Cortical Segmentation
- Cortical Thickness (maps, ROIs)
- Cortical Area (maps, ROIs)

White Matter Tract Measures
- Size of tracts (width, volume)
- FA, MD within tract ROIs
Annualized rate of change in cortical anatomy

Tim Brown, Josh Kuperman, Terry Jernigan, and Anders Dale for the PING Study
Rho = 0.95, $R^2 = 0.90$
mean error = 1.14 years
Higher Scores in Males $p<.004$

- Cortical Surface Area
- Hippocampal Volume
- Striatal Volume
Age By Gender Interaction, $p<.04$
GWAS of Relative Occipital Areal Expansion

Discovery Sample (TOP): \( p = 7.8 \times 10^{-8} \)
Replication Sample (ADNI): \( p = 0.0088 \)

Bakken et al., 2011
GWAS of Relative Occipital Areal Expansion

Bakken et al., 2011
Some Other Active CHD Projects:

- Studies of face processing in children and young adults.
- Longitudinal studies of school-aged children with focus on brain, cognitive, and academic skill development.
- Studies of the impact of social and emotional factors on responses to learning contexts.
- Studies of individual differences in responses of children to adaptive tutorial programs.

Some Pilot Studies Underway:

- Studies of effects of musical training on brain and cognitive development.
- Studies of effects of premature birth on brain and cognitive development.
- Studies of face processing in autism spectrum disorders.
cloud.sdsc.edu

- What is it?
- Why use it?
- How do I use it?
- How much does it cost?
- Can I charge that to my grant?
- Relationship to data curation?
What is it?

- Cloud storage, not cloud computing
  - Analogous to Amazon Web Services S3 cloud
  - Infrastructure as a Service (IaaS)
- Entirely disk-based (“hot storage”)
- Durable (2- and 3-copy options)
- High performance
- Accessible via the Web and campus 10G network
- Designed, built, hosted, and operated at SDSC
- Component of the UCSD Research CI
OpenStack Cloud Storage Model

Scalable in every dimension – “elastic”
Why use it? Cloud Applications

- HPC Compute Data staging and storage
- Backups, including SDSC CommVault Backup Services
- Application integration using supported APIs
- Web application and site hosting
- Serving images/videos (streaming data to clients)
- Data collections and published data sets

NSF Data Sharing Requirement

SDSC UCSD
Cyberinfrastructure Services Division
NSF Data Sharing Requirement

• “Investigators are expected to share with other researchers, at no more than incremental cost and within a reasonable time, the primary data, samples, physical collections and other supporting materials created or gathered in the course of work under NSF grants. Grantees are expected to encourage and facilitate such sharing.”

• Policy has had no teeth until now
  • Beginning Jan. 18, 2011, every NSF proposal must include 2-pg. data management plan*
  • Viewed as part of Intellectual Merits and Broader Impacts

*see rci.ucsd.edu for sample data management plans
Archiving and Collaboration

All data stored in the cluster can be accessed by an HTTP URL. Account administrators can manage who is allowed to access the data through access control lists.

Files are uploaded to the cluster.

Files are instantly available over the web.

---

SDSC Object Storage Cluster
Request an Account

cloud.sdsc.edu
SDSC Cloud Web Interface

- HTTPS
- Put/Get/Rename
- Permissions management
- PW Changes
- Share!
Multiple Graphical Clients...
Rates and Funding Mechanisms

• “On Demand” Cloud Storage
  • Pay for monthly prorated water-mark usage
  • Dual-Copy: $390/TB-Yr.
  • Triple-Copy: $585/TB-Yr. (One off-site copy)
  • *Roughly 2/3 of the rate is hardware and, thus, IDC-free to grants*

• “Micro-Condo” Cloud Storage
  • Grant buys $5k worth of equipment that becomes part of the storage service (IDC-free)
  • Grant then pays annual maintenance costs
  • Initial Hardware: ~$5k capital
  • Maintenance: $1,260 per year
  • Grant gets: 8.5TB of dual-copy or 5.5 TB of triple-copy storage for 5 years
A Comparison... 5 Years x 17TB Dual-Copy

• Rent On-Demand...
  • 17 TB x $390 x 5 Years = $33k
  • IDC on only 1/3... 54% x $11k = $6k
  • Net Grant Cost = $39k

• Buy Into the Condo...
  • $10k Capital
  • Maintenance: $2.5k x 5 Years = $12.5k
  • IDC on Maintenance = 54% x $50k = $7k
  • Net Grant Cost = $29.5k

• ~30% IDC Savings Vs. Today’s Recharge Mechanisms
• ~24% Savings Via Condo Vs. On-Demand Storage
Can I charge that to my grant?

Yes, of course. NSF data sharing policy allows “incremental costs” for data sharing. NIH too.

**Example:** $500K grant x 5% = $25K

This would purchase 5 years of dual copy storage:

- 11 TB using “On Demand” pricing
- 15 TB using “Micro-Condo” pricing
Relationship to data curation?

- Data curation consists of a set of high-level services that can be built on top of SDSC Cloud
  - Discovery, catalogue, metadata, custom interfaces, publishing, ....
- Such services are being developed by UCSD Libraries as a part of the RCI initiative
  - Curation services not yet available
  - 6 pilot projects selected to help define scope and cost
- For more information on data curation, see http://rci.ucsd.edu
Questions?

Email SERVICES@SDSC.EDU for more info!

http://cloud.sdsc.edu
http://rci.ucsd.edu

Cyberinfrastructure Services Division
RESEARCH AFFAIRS UPDATES

- New Patent Acknowledgment Form (handout) – VC Brown
- New COI Requirements (handout) – Valerie Dixon
- University-Industry Taskforce Report Update – VC Brown
- Negotiated Salary Plan – VC Brown
- Chancellor Search Update – VC Brown
BUDGET ACTIONS IN ACADEMIC AFFAIRS – 2009-2011

- Froze and suspended 90 faculty recruitments
- Froze staff recruitments
- Assigned fully loaded furlough cuts to units
- No allocation of equipment renewal funding
- Cuts to administrative units of 6%
- Cut small instructional programs
- Three year support budget cut (15% on average)
- Implementing administrative consolidation plans
- New Campus tax on revenue sources (ASSA) to generate operating revenue
WHAT ARE WE DOING AT UCSD TO ADDRESS THIS?

- Planning for the future
- Faculty Hiring plan
- Funding Streams Initiative
FUNDING STREAMS INITIATIVE (FSI) GOALS: SIMPLIFY AND CLARIFY UC’S FUNDING FLOWS

- Allows revenue (e.g. Tuition income, research idc) to remain at the source campuses instead of being pooled together and allocated by UCOP.

- Exception: sustains the redistribution of undergraduate financial aid through the Education Financing Model (EFM).

- Implements a new tax based on expenditures at the campuses – called a “Systemwide Assessment”. Funds collected will be used to fund central UCOP operations and key System initiatives (e.g. ANR, Merced).

- 2011/12 tax based on 1.6% of 09/10 expenditures intended to collect $278M.

- Changes the methodology for calculating future allocations.
<table>
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<tr>
<th>Campus</th>
<th>Assessment</th>
<th>Percent</th>
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<tbody>
<tr>
<td>UCLA</td>
<td>$ 65.0 M</td>
<td>23%</td>
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<tr>
<td>UCSF</td>
<td>48.8 M</td>
<td>18%</td>
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<tr>
<td>UCD</td>
<td>41.5 M</td>
<td>15%</td>
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<tr>
<td>UCSD</td>
<td>40.9 M</td>
<td>15%</td>
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<tr>
<td>UCB</td>
<td>27.6 M</td>
<td>10%</td>
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<tr>
<td>UCI</td>
<td>26.0 M</td>
<td>9%</td>
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<tr>
<td>UCSB</td>
<td>10.7 M</td>
<td>4%</td>
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<tr>
<td>UCR</td>
<td>8.0 M</td>
<td>3%</td>
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<tr>
<td>UCSC</td>
<td>7.3 M</td>
<td>3%</td>
</tr>
<tr>
<td>UCM</td>
<td>1.8 M</td>
<td>1%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$ 277.7 M</td>
<td>100%</td>
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CAMPUS BUDGET WORK GROUPS
2011/12

Budget Review Work Group

Enrollment Planning Committee

IT Services and Initiatives
BUDGET REVIEW WORK GROUP

- Managed by: Campus Budget Office
- Members: Campus FOs, Faculty, Students
- Charge: Review and Make Recommendations:
  - Campus budget process, policies and practices
  - Current allocation models – Workload and IDC
  - Funding Streams Implementation
  - Distribution of Funding Streams Assessment
ENROLLMENT PLANNING COMMITTEE

Managed by– AVC Sawrey
Members– Standing EPC
Charge

1. Define annual resident and non-resident targets through 2020/21 for undergrads and grads;

2. Estimate annual tuition and fee revenue that will be generated;

3. Recommend modifications to services that will enable the campus to achieve key academic support, student life, and recruitment goals. Include Priority and cost.
IT SERVICES AND INITIATIVES

- Managed by: AVC Administrative Computing
- Members: Cross Campus representation
- Charge:
  1. Explore cost savings opportunities
     - IT Personnel consolidations
     - Purchases and procurement policies
     - Server Consolidations
     - Email and Calendaring services
  2. Evaluate additional IT strategies for efficiency and effectiveness
CONGRATULATIONS
On a Successful
ORU Year