VSoE New Faculty Orientation

Steven O. Moldin, Ph.D.
DC Office of Research Advancement
Office of the Vice President of Research

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DC Office Goals

• Provide USC presence near funding agencies
• Identify large-scale funding opportunities
• Form collaborations within and outside USC to develop competitive applications
• Support proposal preparation
• Navigate federal bureaucracy
Where We Are

701 Pennsylvania Avenue, NW, Suite 540
DC Research Advancement Office
Steven Moldin - Background

• PhD, clinical psychology (Yeshiva U); genetics research (Columbia U); postdoc, genetics (Washington U St Louis)
• Faculty, Washington U School of Medicine
• Eleven years, senior NIH program official
  – 17 RFAs, PAs; 37 workshops
  – Mental disorders (autism, schizophrenia) genetics, genomics, neuroscience
James Murday - Background

- PhD, solid state physics (Cornell U)
- Forty years in chemistry, physics and materials science at DoD’s NRL & ONR
- Architect, US National Nanotechnology Initiative
Allan Olson - Background

- Maintained senior leadership positions in private industry and the U.S. government involving research, strategic planning, program management, systems engineering
- Previous Director of Horizontal Technology Integration
- Holds degrees and certifications in program management, electrical engineering, contracting
- Certified Department of Defense and Federal Program Manager
Research Advancement Services

• Strategic planning

• Proposal preparation - scientific
  - Help develop ‘vision’
  - Help build collaborations (within & outside USC)
  - Writing, reviewing, editing

• Proposal preparation – logistic/administrative
  - Conference/video calls, meetings
  - Budgets, budget justifications, PARs
  - Biosketches, letters of support
  - References, figures

• Federal agency connections / advocacy / intel

• Faculty development
Mission Agency Programs (MAPs)

- [http://web-app.usc.edu/web/ra_maps/](http://web-app.usc.edu/web/ra_maps/) [login required]
- Connect faculty with funding agency program officers
- 500+ program officer profiles across 8 agencies (DHS, DOC, DOD, DOE, DOED, EPA, NASA, USDA)
- 500+ faculty profiles organized by/linked to keywords
% of Assisted Faculty Who Have Utilized Research Advancement Services

- Identify Funding
- Interface with agencies
- Assemble proposal team
- Utilize USC MAPs
- Write proposal
- Review/edit
- Create Figures
- Add references
- Generate admin docs
- Generate budget
- Review budget
- Budget justification
- Set up conference calls
- Coordinate across schools
- Submit application

Legend:
- Blue: Planning/Strategy
- Red: Proposal
- Green: Budget
- Purple: Logistics
Success Rate = 29.6%
DC Office of Research Advancement
Cumulative Dollars Requested

[Graph showing cumulative dollars requested over years (2006-2017) with a peak of $2,846,814,886 in 2017]

Submitted
DC Office of Research Advancement
Cumulative Dollars Awarded

($ Millions)


Awarded

$525,695,401
Research Strengths

- Neuroimaging & Big Data Bioinformatics
- Aging & Alzheimer’s Disease
- Biomedical Devices
- Environmental Health
- Health Policy
- National Security
- Information Science
- Quantum Computing
- Brain Computer Interfaces
- Children’s Health
- Convergent Biosciences
Neuroimaging & Big Data Bioinformatics

- NIH BD2K Centers of Excellence
- Viterbi/ISI data management centers
  - funding from several NIH institutes
- NIDCR Craniofacial Research Hub
- NIH Transformative Research Program: Dynamic Mapping of Neural Synapses
- Mark and Mary Stevens Neuroimaging and Informatics Institute ($50M endowment)
- State of the art equipment - 7 Tesla MRI scanner
- Brain & Creativity Institute
- Dana and David Dornsife Cognitive Neuroimaging Center
Aging & Alzheimer’s Disease

- Zilkha Neurogenetic Institute - world leader for basic neuroscience research
- NIA Alzheimer Disease Research Center (ADRC) - focuses on multi-ethnic communities in greater LA area
- Alzheimer's Therapeutic Research Institute (ATRI) - industry & NIH funding
- Laboratory of Neuro Imaging (LONI) - industry & NIH funding
- NIH funding of multiple training resources in demography & minority aging
- Research programs in digital, global, and personalized aging
- Major focus of USC health policy and neuroimaging research programs
Biomedical Devices

- NSF Engineering Research Center - Biomimetic MicroElectronic Systems
- Resource Center for Medical Ultrasonic Transducer Technology
- Center for Neural Engineering
- Biomedical Simulations Resource
- USC team led by Mark Humayun developed Argus II, a retinal prothesis approved by FDA as first bionic eye in US
- Humayun to receive National Medal of Technology and Innovation from President Obama
Environmental Health

- NIEHS Southern California Environmental Health Sciences Center (SCEHSC) works to reduce the burden of adverse effects from the environment.
- EPA/NIEHS Southern California Children’s Environmental Health Center (SCCEHC) conducts studies on near-roadway air pollution’s role in the development of obesity & metabolic abnormalities that increases risk of type 2 diabetes.
- NIEHS/EPA Children’s Health Study (CHS), one of the largest & most detailed studies of long-term effects of air pollution on children’s respiratory health.
- NIEHS/NIMHD Maternal And Developmental Risks from Environmental & Social Stressors Center (MADRES) studies low-income, urban minority communities in Los Angeles that have both high obesity rates & wide-ranging exposure to environmental pollutants.
Health Policy

- Schaeffer Center for Health Policy and Economics: joint Pharmacy/Price
- Center for Economic and Social Research
- Two NIH Roybal Centers: Health Policy Simulation & Health Decision Making & Financial Independence in Old Age
- NIA Research Center for Minority Aging Research
- NIA training program in the demography of aging
- Partnership between Schaeffer Center and Brookings
- US News & World Report “health policy and management”: Price School ranked third nationally
National Security

- DHS National Center for Risk and Economic Analysis of Terrorism Events (CREATE) (bridge funding to new competition)
- Cyber DEfense Technology Experimental Research Laboratory (DETER) shared testbed providing a platform for innovative cybersecurity technology
- DARPA Center for Rapid Automated Fabrication Technologies (CRAFT): faster & more secure chip design & fabrication
- DARPA Low Resource Languages for Emergent Incidents (LORELEI): exploiting language information for situational awareness
- IARPA Domain-Specific Insight Grafts (DIG): index fine grained data collection, organization & analysis of social and other media
- IARPA Graphics-Based Learning Approach Integrated with Vision Enhancements (GLAIVE): applying machine learning techniques to pattern recognition & computer vision
Information Science

- Viterbi Information Science Institute (ISI) - cutting edge medical informatics, intelligent systems, computational systems, advanced electronics, configurable robotics, grid technologies, Big Data management & integration
- Institute for Creative Technologies (ICT) - ‘virtual’ humans, graphics, cognitive architectures, AI, emotion modeling
- Army Research Lab (ARL) West partnership
- Integrated Media Systems Center (IMSC)
- Leadership in virtual reality
Quantum Computing

• Center for Quantum Information Science and Technology (QCIST) led by Daniel Lidar
  – IARPA-funded program - USC Quantum Computation and Open Quantum Systems
• USC-Lockheed Martin Quantum Computing Center (QCC) at the Informational Sciences Institute: closing the gap between quantum computation and real life critical problems
  – D-Wave 2X™ one of two commercial adiabatic quantum optimizer worldwide
• Neural Systems Engineering & Information Processing (NSEIP) Lab led by Maryam Shanechi:
  – Using algorithms modeling and in vivo experimentation to design closed-loop brain-computer interface (BCI) machines
  – US/UK multidisciplinary MURI to explore BCIs for enhanced decision making
Children’s Health

- LA DREAMERs (Life-course Approach to Developmental Repercussions of Environmental Agents on MEtabolic Respiratory health),
  - NIH Environmental Influences on Child Health Outcomes (ECHO)-funded initiative led by Frank Gilliland
  - Incorporates satellite and ground-based pollutant measurement to compare with biomarkers and health outcomes
Convergent Biosciences

• Michaelson Center for Convergent Bioscience (MCCB): 186 researchers from 17 labs and several other interdisciplinary initiatives, including:
  – MCCB Bridge Institute (Ray Stevens)
  – CSI-Cancer (Peter Kuhn)
  – Cellular Imaging (Scott Fraser)
  – Discovery Informatics (Carl Kesselman)
  – Drug Discovery (Charles McKenna, Steve Kay)
  – Center of Data, Algorithms and Systems for Health, DASH (Fei Sha)
Unique USC Resources

- **Information Sciences Institute (ISI)**
  - $60 million annually from >20 federal agencies / corporations
  - [http://www3.isi.edu/home](http://www3.isi.edu/home)

- **Institute for Creative Technologies (ICT)**
  - US Army University Affiliated Research Center (UARC)
  - [http://ict.usc.edu/](http://ict.usc.edu/)

- **Clinical Resources**
  - [http://sc-ctsi.org/](http://sc-ctsi.org/)

- **Schaeffer Center for Health Policy and Economics**
  - Recruited Nobel Laureate in Economics (Daniel McFadden)
  - >$25 million in NIH grant support
  - [http://healthpolicy.usc.edu/](http://healthpolicy.usc.edu/)

- **School of Cinematic Arts**
  - #1 ranked cinema/film school (*US News and World Report*)
  - #1 game design program (*Princeton Review*)
  - [http://cinema.usc.edu/](http://cinema.usc.edu/)

- **Outreach Partners**
Information Sciences Institute (ISI)

- Cutting edge computer and information science:
  - Medical Informatics
  - Intelligent Systems
  - Computational Systems
  - Advanced Electronics
  - Configurable Robotics
  - Grid Technologies
- Very large scale data management & integration
- $60 million annually from >20 federal agencies / corporations
- DOD, DHS, DOE, NSF & NIH funding (NIGMS, NHGRI, NIMH, NHLBI)
- 350 engineers, research scientists, graduate students, and staff
- EHRs, electronic healthcare systems
- Developed Domain Name System (DNS) and “.com” address system
- **MOSIS** - low-cost prototyping & production volume service for VLSI circuit development
Institute for Creative Technologies (ICT)

- US Army University Affiliated Research Center (UARC)
- Biomedical research projects include:
  - Virtual Reality Augmentation (social skills training for autism)
  - Virtual Iraq/Afghanistan (PTSD assessment and treatment)
  - Virtual Humans (STEM education)
  - MedVR Lab (clinical training)
  - NeuroSim Lab (cognitive assessment)
- Paul Debevec (2009 Scientific and Engineering Academy Award)
USC Clinical Resources: Highlights

- Rehabilitation Medicine
  - #1 Physical Therapy department (*US News and World Report*)
  - #1 Occupational Therapy department (*US News and World Report*)
- Emergency Medicine Department
  - 150,000 annual visits
  - 28% of all trauma care in LA county
- Department of Urology
  - Urology Robotics Center of Excellence (Dr. Inderbir Gil)
- Department of Ophthalmology (retinal prosthesis)
- NIH-funded CTSA (Dr. Thomas Buchanan)
- Public health focus (cancer epidemiology, preventive medicine, tobacco control)
Unique Clinical Partners

- LAC+USC Healthcare Network
  - 600 beds
- Keck Medical Center of USC
  - Keck Hospital of USC
  - USC Norris Cancer Hospital/ NIH Comprehensive Cancer Center
- Children’s Hospital Los Angeles (CHLA)
  - 347 beds
Schaeffer Center for Health Policy and Economics

- Established by donor gift in 2009
- Collaboration between USC School of Public Policy and USC School of Pharmacy
- Led by Stanford trained economist Dana Goldman
- Recruited Nobel Laureate in Economics (Daniel McFadden)
- Strong partnerships with Harvard, Stanford, Dartmouth, Boston University, Brookings Institution and RAND Corporation
- >$25 million in NIH grant support
  - Behavioral Economics, Science of Medicare Reform, Health Policy & Simulation
School of Cinematic Arts

- #1 ranked cinema/film school in US
- Six Divisions
  - Critical Studies, Animation & Digital Arts, Interactive Media, Film & TV Production, Producing, Writing
  - #1 ranked game design program
- Interest in health
  - Health behavior game (RWJF)
  - Obesity prevention game (NIH)
  - Immunology education game (NSF)
  - Autism education project (AHRQ)
- Faculty awards include Oscars, Emmys, Golden Globes, Pulitzer, etc
- **Private donors** - e.g., George Lucas, Steven Spielberg, Jeffrey Katzenberg, Brian Grazer
- **Corporate donors** - e.g., Walt Disney, Microsoft, Electronic Arts, Warner Bros
- **Public & private funding** - AHRQ, NIH, USDA, Dept of State, Gates Foundation
Unique Outreach Partners

- **California Science Center (CSC)**
  - 1.4 million annual visits (370,000 children)
  - Two-thirds are Hispanic & African-American
  - Admissions-free venue allows for informal science education testbed

- **Natural History Museum of Los Angeles County**
  - > 35 million specimens, dating back 4.5 billion years
  - A basis for biodiversity studies

- **Los Angeles Unified School District (LAUSD)**
  - 2nd largest public school system in the U.S.

- **SETI Institute**
  - Funded by NASA, NSF, DoE, and numerous private donors
  - Potential for astrobiology & other science partnerships
  - Citizen Science outreach program
Center for Excellence in Research (CER)

- CER Research Advancement Workshops
  - Example workshops include:
    - THIS EVENT!
    - Developing NIH Applications (Dr. Steven Moldin)
    - Preparing and Submitting NSF Proposals (Dr. Phil Taylor)
    - Developing and Submitting a DoD and DoE Research Grant (Dr. James Murday)
    - [http://research.usc.edu/about/vp/cer/](http://research.usc.edu/about/vp/cer/)

- Proposal Review Service
  - Peer-to-peer proposal review for applications to external funding agencies
  - Notify Office of Research 4 weeks before proposal due date

Contact info: Silvia da Costa in the Office of Research (sdacosta@usc.edu or 213-740-6709)
Internal Funding from USC

- **Zumberge Fund Awards**
  - **Interdisciplinary Awards (LARGE):**
    Funding amount: $85,000
    Due Date: July 2015
  - **Interdisciplinary Awards (SMALL):**
    Funding amount: $10,000
    Due Date: Open
  - **Individual Awards:**
    Funding amount: $30,000
    Due Date: January 2016
  - [http://research.usc.edu/for-investigators/funding/usc/zumberge/](http://research.usc.edu/for-investigators/funding/usc/zumberge/)

- **USC Collaboration Fund**
  - Organization of workshops, seminars, online resources, etc.
    Funding amount: $30,000
    Due Date: February 2016
  - [http://research.usc.edu/for-investigators/funding/usc/collaboration/](http://research.usc.edu/for-investigators/funding/usc/collaboration/)

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Composition of the Federal Budget

Outlays as share of total budget, 1962 - 2016

Source: Budget of the United States Government; FY 2016. "Investments" include outlays for R&D, education and training, direct nondefense infrastructure, and other grants, primarily for transportation. "Payments to Individuals" are primarily entitlement programs like Medicare, Medicaid, and Social Security, but also include many other public assistance programs. © 2015 AAAS
R&D as Percent of the Federal Budget:
FY 1962-2017, in outlays

Source: Budget of the U.S. Government FY 2017 Historical Tables. FY 2017 is the request. © 2016 AAAS
Figure 2: Composition of the Proposed FY 2017 Budget
Total Outlays = $4.1 trillion
outlays in billions of dollars

Net Interest $303
Defence Discretionary* $529
[Defence R&D]* $79
Nondefence Discretionary* $557
[Nondefence R&D]* $68
Other Mandatory $656
Medicaid $386
Medicare $598
Social Security $967

*Approximately $4 billion for R&D is financed through mandatory spending. Figures are estimates.
Source: Budget of the United States Government FY 2017. © 2016 AAAS
Billions of constant FY 2016 Dollars

Source: 1975-1994 figures are from the NSF federal funds survey; remainder is from AAAS R&D reports. FY 2016 are estimates, FY 2017 is the President's request. © 2016 AAAS
obligations in billions of constant FY 2016 dollars

"Other" includes research not classified (includes basic research and applied research; excludes development and R&D facilities). Life sciences are split into NIH support for biomedical research and all other agencies' support for life sciences.

Source: National Science Foundation, Federal Funds for Research and Development series. FY 2016 and 2016 data are preliminary. Constant-dollar conversions based on OMB's GDP deflators. © 2016 AAAS
Current Estimates of R&D in the FY16 Budget
percent change from FY15, constant dollars

- NIST
- NOAA
- Transportation
- DOE Energy Programs
- Agriculture
- US Geological Survey
- DOD Other
- Environ Protection Agency
- Veterans Affairs
- National Science Foundation
- DOE Science
- National Institutes of Health
- NASA
- DOE Defense
- DOD S&T
- Homeland Security
- TOTAL

Based on AAAS analyses of OMB, OSTP and agency budget data. The above adjusts for inflation, expected at 1.6 percent.
Federal Funding

Research Support
- DOD Young Investigator Program (DOD YIP)
- NSF Faculty Early Career Development Program (NSF CAREER)
- DOE Early Career Research Program
- NIH individual fellowship and career development awards (pre- and postdoctoral; clinical and basic; mentored and non-mentored)
- NIH Transformative Research Awards (R01)
- NIH Pioneer Award Program (DP1)
- NIH Director’s New Innovator Award Program (DP2)
- NIH & NSF institutional training grants (T32, NRT)

Lab Infrastructure Support
- NIH Shared Instrumentation Grant Program (S10)
- NSF Major Research Instrumentation Program (MRI)
- DOD Defense University Research Instrumentation Program (DURIP)
DC Office for Research Advancement

Additional questions, advice:
Dr. Steven Moldin
moldin@usc.edu
http://twitter.com/#!/usc_dcresearch
202-824-5860