



New Faculty Orientation: Research

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Vice Dean for Research

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Director Of Research Administration

About the (first) Presenter



- B.S., University of Kansas, 1986, Ph.D., UIUC, 1991, all degrees in ECE
- NASA Jet Propulsion Laboratory 1991-2003
- University of Michigan EECS 2003-2011 (started as Assoc. Prof., promoted to Prof. in 2008)
- Joined USC in 2012, Ming Hsieh Department of Electrical (and Computer) Engineering
- Research: Applied Electromagnetics, Radar Systems, Remote Sensing, Medical Imaging and Therapy Systems, Wireless Sensor Networks
 - Highly interdisciplinary (ecology, hydrology, medical, etc)
 - Research group of ~15, including students, research faculty, post-docs
 - Funding from NASA, NSF, USGS, DoD, industry
- Some of USC roles: Chair of EE Faculty Recruiting Committee, Chair of University Research Committee, Co-Chair of University Committee on Appointments, Promotions and Tenure (UCAPT), Chair of Research Committee of President's Working Group (PWG) on Sustainability, co-Chair of PWG, numerous other committees
- Some of outside roles: NASA Advisory Council ESS Subcommittee, Editor-in-Chief of IEEE Antennas and Propagation Magazine, President of IEEE Antennas and Propagation Society, various other editorial roles, IEEE GRSS and APS AdCom member, membership and chairship of various working groups and workshop/conference organizing steering committees, various National Academies committees....



Goal & Methods

<https://viterbischool.usc.edu/researchandinnovation/>

- Goal: Facilitating and Enhancing Research Excellence
- Methods:
 - Programs for junior faculty
 - Active dissemination of opportunities (gist & web)
 - Leveraging Office for Research opportunities
 - Collaborating with other USC schools & units
 - Help with center and other large-scale proposals
 - VICI fund for incubating centers
 - Visioning exercises and strategic initiatives
 - Awards Office
 - Viterbi Research Committee



Junior Faculty Programs

- At least one mentor for pre-tenure faculty
 - mentoring lunches, meetings
- Funding for travel to meet with sponsors
 - if not already in startup package
- Internal review program for NSF Career proposals
- “Best practice” advice for early career/young investigator program
- Viterbi support for YIP proposals, especially broader impact
 - E.g., reduced indirect costs for DoD, DoE and NASA.
- Directed dissemination of YIP funding opportunities
- Personalized advice from the DC Research Office

University & Viterbi Research



- USC is a “Research I” university
- USC has consistently risen in national research volume rankings:
 - In total research expenditures (~\$890M): around 11th among private and around 23rd among all (ahead of UC Berkeley, Northwestern)
 - In federal expenditures (>\$500M): 10th among private and 19th among all (ahead of MIT)
 - Viterbi is the 2nd largest contributor (after Keck/Medicine)
- Viterbi’s research expenditures are about 210M per year (3rd among private, after MIT and Stanford, 8th overall) ; this includes all engineering-affiliated centers and faculty and all types of research funding (federal, corporate, and private)
- The funding portfolio is distributed over various sources

Interdisciplinary Research



- USC spotlights **societally relevant research**; such research is inherently interdisciplinary (read USC vision doc)
- Interdisciplinarity is a major strength of USC
- Take advantage of our varied strengths in the numerous schools: Keck, Annenberg, Dornsife, Dentistry, Kinesiology, Gerontology, Cinematic Arts...
- BUT: pre-tenure interdisciplinary research should be undertaken with caution:
 - Must show a major contribution in at least one field, cannot straddle and be OK “overall” or “on average”
 - Promotion letters needed from recognized major figures in the field
- If you are defining a new area, make sure it is recognized and considered a contribution; give talks far and wide, and publish in recognized established journals with good impact factors

USC Office of Research



<https://research.usc.edu>

- Under Vice President of Research Ishwar Puri
 - reports to the Provost
- Purpose: help faculty in the process of research:
 - University-level strategy, initiatives, partnerships
 - Training courses via the Center for Excellence in Research (CER)
 - Support for shared equipment cores
 - Cost-share on center proposals
 - Internal funding programs
 - Funding information dissemination
 - Management of institutionally limited funding opportunities
 - Oversight of USC Stevens Institute of Innovation
 - Washington DC office

Washington DC Branch of USC Office of Research



<https://ora.usc.edu/>

- Steve Moldin, Executive Director, most experience with NIH
- Jim Murday, DoD expertise, especially nano & energy
- Al Olson, intelligence community & other services
- Internal NSF experience from several NSF staff and rotators
- Multiple consultants in DC
- Facilitate large grants, meetings with DC funders, workshops in DC and locally, visits by funders...
- First contact: Vice Dean Mahta Moghaddam (mahta@usc.edu)
 - Connection to the Vice President for Research
 - Connection to the DC Office and Steve Moldin

Center for Excellence in Research (CER)



<https://orif.usc.edu/cer/>

- A Senate-Provost initiative that originated in the University Research Committee by M. Matarić
- The USC Office of Research supports and houses the program and offers a menu of information and training workshops about obtaining funding from various federal agencies, industry, foundations, etc.

Internal Funding Opportunities: University Level



<https://orif.usc.edu/funding/>

- Zumberge: individual (\$30K, year-round), multi-school interdisciplinary (\$85K, annual), diversity and inclusion (30k), and epidemic-related.
- Collaborative Research Fund (\$30K/year, up to 3 yrs)
- Core Instrumentation Fund: Two types. As-needed cost-share (like NSF MRI).
- WiSE: \$25k support. Deadline in Sept. 2022 and in Jan. 2023.
- Initiatives:
 - SC Clinical and Translational Science Institute (varying amounts and foci)
 - Ming Hsieh Institute for Research of Engineering-Medicine for Cancer and other Diseases (\$150k per year).
 - Many others, see web page

Contracts & Grants Administration



- **Central:** Dept. of Contracts and Grants (DCG), run by Jeri Muniz, under the VP for Research Ishwar Puri; *submits ALL proposals*
 - Compliance with federal and other funding submission regulations
 - Amanda Reguengo is the Principal Officer for Viterbi in DCG
- **School-level:** Viterbi Business Affairs (VBA) Office, *approves proposals before proceeding to DCG & submission; oversees school-level compliance for pre- and post-award.* Viterbi contact to DCG: Nichole Phillips, Director of Viterbi Research Administration or Nicole Burelli, Director of Research Administration Operations
- **Local/department-level:** Your dept. business manager will assign a research administrator, *who prepares proposal administrative shells and submits to VBA*
 - They are here to **support** ***BUT please:***
 - *Be mindful of people involved and timing expectations*
 - *Read the memos/emails*
 - *Report problems to Nichole Phillips or Nicole Burelli*

Viterbi Proposal Timeline



- Notify your Research Administration (VBA-RA) about your intent to submit and provide a link or attachment of announcement
- 7-9 Business Days Prior to Submission the Proposal Packet should reach VBA office
 - If not received 3 Business Days prior to submission may be returned and not submitted
 - In General this consists of:
 - RFP/Guidelines
 - Cover Sheet for Signature (if electronic then just print the cover sheet for ex. NSF) unless S2S then not needed.
 - Budget
 - Budget Justification
 - Draft of Scope of Work/Technical Justification
- 3 Business Days Prior to Submission submit all Final documents to the DCG

Facilities and Administration



- Facilities and Administration = indirect cost, overhead
- Pays for operating expenses of the university & school
- Overhead rate is 65%, determined by USC not Viterbi
- On par with comparable universities
- Of that 65%, ~12 pts (19%) goes to the Central USC Facilities Fund; there is also an overall participation tax (6%)
- Research is not really a revenue source
- Things that do not incur overhead:
 - Equipment (> \$5,000)
 - Tuition
 - Participant support costs
 - Subawards/contracts (only the first \$25k of subs are subject to overhead)
 - Agency-mandated no overhead programs (see cost-share)

Cost-Share



- Cost-Share = Viterbi's subsidy for a specific effort/proposal; a cost to the school
- Facilities and Administration can be cost-shared under appropriate conditions; this is an income loss for the school
- Some federal grant programs and some foundations require it
- All cost-share requests must be submitted through the Viterbi online cost-share system at least 14 business days prior to the proposal submission deadline (at least a month for centers and/or other collaborative proposals with multiple schools involved)
- <https://viterbibusinessaffairs.usc.edu/research-administration/cost-sharing>

Viterbi Dissemination of Opportunities



- Weekly Research Gist
 - Funding opportunities
 - Local meetings/workshops
 - Research-relevant university announcements
 - Email from the vice dean for research

- Comprehensive research portal:

<https://viterbischool.usc.edu/researchandinnovation/>

- Awards
- COVID-19 FAQ for USC Viterbi Researchers
- Faculty Research Topics
- Faculty Research Resources
- Funding Sources for Undergraduate Research
- NAE Grand Challenges
- Research Centers
- Research Infrastructure
- Research Initiatives
- Research Vision
- Student Resources for Undergraduate Research

Early Career & Young Investigator Awards



- Many agencies have early career awards: NSF, NIH, ONR, Army, Air Force, CDMRP, DoE, etc.
- Your odds of getting these are higher than for other types of grants
- These are often considered prestigious (e.g., NSF CAREER, ONR Early Career) and lead toward higher-level honors & awards (NSF and other PECASE awards)
- These pave the way for future awards from the same agency
- These help you get tenure (some type of YIP award is basically expected for promotion in Viterbi)

NSF CAREER Awards



- Most of our assistant professors get these
- You can apply up to 3 times
- Plan strategically and be ready:
 - Contact the relevant agency program director to learn more and discuss your plans
 - Take the Provost's training course in May
 - Participate in the internal review program
 - Take broader impact very seriously (for all NSF grants, not just CAREER); it may decide if you get funded among the top candidates
- This advice applies to all other early career proposals as well

Broader Impacts



- NSF and some other agencies focus on broader impact & outreach
- A web page or a standard course not sufficient; instead, consider:
 - A well thought-out outreach program
 - K-12 teacher training & local school visits
 - Partnership with a public institution (e.g., California Science Center)
 - Many more good models, be creative
 - Example: NSF RET Program (supplements and sites) and GK-12 Program (BE-LA)
- Societally relevant research is a key tenet of the USC Vision
- Viterbi K-12 STEM Center help each faculty member individually design a broader impacts program for Career and other proposals (<https://viterbik12.usc.edu>)



Viterbi Internal Center Incubator (VICI)

- VICIs created to bolster the transformative vision of the School
 - Goal: enable multiple clusters of faculty to collaborate along high-impact technology and societal directions
- Ten centers selected by the Viterbi Research Committee in 2015-2018 via a competitive proposal process
 - Seed funds of up to \$80k per center
- Several other centers created separately during same time period
 - Seed fund amounts vary

<https://viterbischool.usc.edu/faculty/faculty-research-resources/research-initiatives/viterbi-internal-center-incubator/>

Current Competed VICIs



Center Name	Focus Area	Director
AWARE: Center for Arid Climate Water Research	Water, sustainability, climate	Mahta Moghaddam
Biomimicry for Synthesis of Smart Textiles	Materials engineering	Malancha Gupta
CENTIENTS: Center for Intelligent Environments	Built environment	Burcin Becerik-Gerber
CMPI: Center for Machine and Process Intelligence	Data analytics	Joe Qin
CIEBOrg: Center for Integrated Electronics and Biological Organisms	Materials and neuroscience	Megan McCain Rehan Kapadia
CPPE: Center for Peptide and Protein Engineering	Materials, proteins, peptides	Rich Roberts
HealME: Healthcare and Medical Engineering	Healthcare	Ellis Meng
RASC: Robotics and Autonomous Systems Center	Robotics, AI	Maja Mataric Gaurav Sukhatme
SleepHUB: Center for Sleep Health Using Bioengineering	Sleep disorders	Michael Khoo
Vertex	Networks and Control	Urbashi Mitra

Directed VICIs



Center Name	Focus Area	Director
CAIS: Center for Artificial Intelligence in Society	AI	Bistra Dilkina (co-director)
CAM: Center for Advanced Manufacturing	Manufacturing	SK Gupta
CCI: Center for Cyberphysical Systems and the Internet of Things	IOT	Bhaskar Krishnamachari
MASCLE: Center for Machine Learning	Machine learning	Yan Liu
CSC@USC: Center for Systems and Control	Control systems	Mihailo Jovanovic



Other Research Centers

<https://viterbischool.usc.edu/research-centers/>

- Research centers of excellence are a means of facilitating high-impact usually interdisciplinary research
- Viterbi has many centers
- Participate, enhance your research, collaborate, leverage
- BUT: keep your research contribution clear and identifiable
- AND: don't get involved in a major service role in centers before tenure (e.g., Education Director, Outreach Director, etc.)

Support for “New Research Initiatives”



- Ideation, team-building, and implementation of new research initiatives
- Coordination between faculty research, industry partners, and Advancement activities
- Coordination of convergent research initiatives between USC Viterbi and other entities both on-campus and off-campus
- Targets of specific active pursuit:
 - NSF ERC, STC, and MRSEC proposals
 - MURIs
 - NIH centers
 - DoE EFRC, DoD centers, EPA SCPC
 - Corporate and Foundation relationships for basic and applied research
 - We have been holding annual meetings/webinars to go over these opportunities and provide information/motivation

Facilitating Center-Scale Proposals



- We want to encourage Viterbi leadership on large, center-level proposals
 - Proposal management support, teaching release, discretionary resources, etc.
 - Submit requests to Mahta Moghaddam
- Use proposal coordination process led by Nichole Phillips
 - Graphics support (<https://viterbischool.usc.edu/graphic-design-and-web-resources-for-usc-viterbi-faculty-and-staff/>)
 - Grant writer/editor support
- Initiate space request negotiation (Vice Dean Kim Bregenzner)
- Streamlined cost-share procedures (on-line form)
- Interaction with the VP for Research via Vice Dean for Research to get support for interdisciplinary=multi-school proposals
- **Need to reach out early in order to provide support and contract with outside vendors such as graphic artist and/or writer/editor**

Viterbi Core Infrastructure



<https://viterbischool.usc.edu/shared-research-infrastructure/>

- Shared core infrastructure with user fees:
 - Core Center of Excellence in Nano-Imaging (CNI, Andrea Hodge)
 - John O'Brien NanoFab Core & Cleanroom (Andrea Armani)
 - Center for Peptide and Protein Engineering (CPPE, Rich Roberts)
 - Viterbi-Dornsife Machine Shop
 - Center for Advanced Manufacturing (CAM, SK Gupta)
 - Structures and Materials Research Laboratory (SMRL, Bora Gencturk)
 - USC-Lockheed Martin Quantum Computing Center (Daniel Lidar)
- Programs:
 - Provost's Core Infrastructure Initiative
 - NSF Major Infrastructure Program (MRI)
 - DoD DURIP Program
- Networking with existing centers & institutes to leverage resources

Corporate & Private Funding



- Corporate and Foundations Relations Office: Maurena Nacheff-Benedict, Executive Director
- <https://viterbischool.usc.edu/giving/corporate-foundation-relations/>
- Special RFPs with partnering companies (GE, Lockheed Martin)
- IP negotiations can be lengthy...



Industrial Partnerships

- Airbus Institute for Engineering Research (AIER)
- Amazon Center for Trusted AI
- Center for Machine Learning (MASCLE)
- Center on Advanced Manufacturing (CAM)
- Cyber-Physical Systems and the Internet of Things (CCI)
- Michelson Center on Convergent Bioscience – Agilent Center of Excellence
- Pratt & Whitney Institute for Collaborative Engineering (PWICE)
- TCC Foundation Center for Reduced Emissions Using Plasma
- USC Center for Artificial Intelligence in Society (CAIS)
- USC-Lockheed Martin Quantum Computation Center
- CiSoft: Center funded by Chevron; possible model for other centers

Expectations: Our Vision



- 3 GRAs funded per year can be regarded as a minimum expectation
- Fellowships and TAs are in addition to that
- One PhD graduated per year, one new PhD student taken on
- 5 years in the PhD program per student (could be, e.g., 1 as TA, one as fellow, and 3+ as GRA)
- At least 2 proposal submissions per year as PI, the range goes to 30+
- Co-PI and other roles are extra and encouraged
- These are minimal numbers: do the calculation for how much it takes to sustain a pipeline of 3+ GRAs given funding rates (varies among agencies) and plan proposal submissions accordingly

Pointers for Getting Research Funding



- The economy can always be in better shape; research support has been steady, no telling what will come next
- Basic advice:
 - Connect with program managers/administrators at federal agencies, “visit” if possible, talk to them
 - Serve on review panels as much as possible
 - Read winning proposals and get people to read your proposals and give you honest feedback
 - Talk to research mentors about the content of your research and your research strategy
 - Get your students engaged early in research, writing papers, and helping with proposals
 - **It is necessary to be strategic and well prepared**

We Are Here to Help



- Mentoring programs (this is part of it)
- Help with proposal submission (VBA)
- Faculty forums with key visitors:
 - luminaries
 - representatives from funding agencies
- Weekly research gist
- Memos with important news
- Research portal
- Special programs for junior faculty, as well as PhD students and postdocs
- Extra support for center-level proposals

Research in the time of COVID-19



- Around mid-March 2020 almost all on-campus research stopped.
- Around mid-June 2020 on-campus research restarted.
- Then it was phase 2b: 10' physical distancing, 30% capacity for experimental and 10% capacity for computational/theoretical research groups.
- Then Moved to 50% for experimental and 20% for computational
 - Every lab needed an approved research restart plan for on-campus research.
- Now back to fully open research mode
- PPEs provided by the school to departments and then to faculty.
- Requirements: (a) PPEs, (b) Physical distancing, (c) Trojanlearn module, (d) Trojancheck
- FAQ Web sites:
- <https://viterbischool.usc.edu/covid-19-faq-for-usc-viterbi-researchers/>
- <https://we-are.usc.edu/faqs/research-faqs/>

Resources for Junior Faculty



- New faculty orientation
- NSF Career award internal review program (2 reviews per proposal by previous winners) with Broader Impacts help (Dr. Katie Mills)
- Cost-share on early career awards (except NSF and NIH, where it is not allowed)
- Travel funds for junior faculty
- Reduced teaching load
- Faculty mentoring program



Mentoring

- *Each of you should have a mentor with whom you have a productive relationship*
- All pre-tenure faculty have at least one, preferably two, assigned mentor(s); tell us if it's working
- HOWEVER: assigned mentors are not always ideal
- Tell us your preferred mentor, and we will work to set it up
- Vice Dean Timothy Pinkston will meet with each of you
- Use the following individuals as mentors: assigned mentor, dept. chair, vice deans, (more) senior colleagues you like
- Take the time to network and talk to people

Keep the Dialogue Going



- *Contact info:*
 - Email to me (mahta@usc.edu) AND assistant: Marjorie Brownbill: brownbil@usc.edu
For appointments contact Marjorie
 - Nichole Phillips (VBA): nicholep@usc.edu 213-740-3237
 - Nicole Burelli (VBA): Burelli@usc.edu 213-821-6148
 - Amanda Reguengo (DCG): amandas@usc.edu 213-740-6064
- We move as fast as possible, but please leave enough time for addressing and iterating on issues
- We want you to succeed. Own the school, it's yours to shape and lead!