



# Faculty Orientation: Research

**Mahta Moghaddam**  
**Vice Dean for Research Viterbi**

# About the Presenter



- B.S., University of Kansas, 1986, Ph.D., UIUC, 1991
- NASA Jet Propulsion Laboratory 1991-2003
- University of Michigan 2003-2011 (started as Assoc. Prof., promoted to Prof. in 2008)
- Joined USC in 2012
- 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 variable mix of 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, member of University Committee on Appointments, Promotions and Tenure (UCAPT), Viterbi Vice Dean for Research (interim, while Maja Mataric on sabbatical), numerous other committees
- Some of outside roles: NASA Advisory Council ESS Subcommittee, Editor-in-Chief of IEEE Antennas and Propagation Magazine, various other editorial roles, IEEE GRSS and APS AdCom member, membership and chairship of various working groups and workshop/conference organizing steering committees

# Goal & Methods



<http://viterbi.usc.edu/research>

- Goal: Facilitating and Enhancing Research Excellence
- Methods:
  - *A set of programs for junior faculty*
  - Active dissemination of opportunities (gist & web)
  - Connecting with the Office for Research
  - Connecting with other USC schools & units
  - Help with center and other large proposals
  - The Research Innovation Fund
  - Visioning exercises and strategic initiatives
  - Awards nominations
  - Viterbi Research Committee

# Junior Faculty Programs



- At least one mentor, preferably two, for pre-tenure faculty
  - mentoring lunches, meetings, other ways to facilitate
- 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
  - E.g., reduced indirect costs
- Directed dissemination of YIP funding opportunities
- Dedicated web site with opportunities  
(<http://viterbi.usc.edu/research/info/funding-opportunities-for-junior-faculty.htm>)

# University & Viterbi Research



- USC is a Research I university
- USC has consistently risen in national research volume rankings:
  - In total research expenditures (>\$500M): around 10th among private and around 25th among all (ahead of Yale & Harvard)
  - In federal expenditures (>\$200M): 10th among private and 19th among all (ahead of Yale)
  - Viterbi is the 2nd largest contributor (after Keck/Medicine)
- Viterbi's research expenditures are about 1/3 of USC's; 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: KSoM, Annenberg, College, Dentistry/Kinesiology, Gero, Cinematic Arts...
- BUT: pre-tenure interdisciplinary research has risks:
  - 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



<http://research.usc.edu>

- Under Vice President Randolph Hall (formerly of Viterbi)
  - reports to the Provost
- Purpose: help faculty in the process of research:
  - University-level strategy, initiatives, partnerships
  - Training courses via CER
  - Shared equipment cores
  - Cost-share on center proposals
  - Internal funding programs
  - Funding information dissemination
  - Match-making with funding agencies, program directors & managers
  - Announcing opportunities
  - Washington DC branch

# Washington DC Branch of USC Office of Research



<http://dcresadv.usc.edu/>

- Steve Moldin, Executive Director, superb NIH expertise
- Jim Murday, DoD expertise, also nano & energy
- Al Olson, intelligence community & other services
- Internal NSF experience from Timothy Pinkston and Sven Koenig
- Multiple consultants in DC
- Facilitate large grants, meetings with DC funders, workshops in DC and locally, visits by funders...
  
- First contact: Vice Dean for Research Moghaddam (mahta@usc.edu)
  - Connection to the Vice President
  - Connection to the DC Office and Steve Moldin
- We hold monthly meetings w/ Steve to strategize



# Center for Excellence in Research (CER)



<http://research.usc.edu/about/vp/cer/>

- A Senate-Provost initiative that originated in the University Research Committee by M. Mataric
- The USC Office of Research supports and houses the program
  - Faculty Fellows: 6 senior faculty who serve as resources for mentoring, and deliver workshops and/or salons, and advise the VP for Research
  - Training Workshops: a wide spectrum of useful training courses relevant to obtaining research funding, highly recommended!

# University Research Committee (URC)



- Joint Academic Senate and Provost Committee
- Advises the Senate, Provost, and VP for Research
- Run by a Viterbi faculty member for 4 of the 5 most recent years
- Activities:
  - Established the DC office for Research
  - Recommending strategic partnerships
  - Revising ORU & establishing UORU structures
  - Improving research administration and tools
  - Working on operationalizing interdisciplinary
- Example of high-impact university service committee; usually more senior faculty are selected, but keep it in mind

# Internal Funding Opportunities: University Level



<http://research.usc.edu>

- Zumberge: small w/ mentor (\$10-\$25K, year-round) and large interdisciplinary (\$50K, annual), competitive
- Research Collaboration Fund (\$30-\$60K)
- Core Instrumentation (\$300K), as-needed cost-share (up to \$200K), also technician funds
- WiSE: undergrad (\$5K/semester), grad top-off, faculty support (up to \$50K every 4 yrs), travel (\$2500/year)
- Initiatives:
  - Clinical and Translational Health Science (\$50K-\$80K/year)
  - Ming Hsieh Institute for nanoscience for cancer
  - Humanities & Social sciences (\$1M/year, \$5-25K/year): can be collaborative
  - Many others, see web page

# Internal Funding Opportunities: School Level



<http://viterbi.usc.edu/research/info/vsoeinitiatives/vsoe-research-innovation-fund.htm>

## Viterbi Research Innovation Fund (RIF)

- Goal: facilitate and showcase key research areas
- The RIF was previously used to fund small proposals:
  - National workshops held at Viterbi, setting up or revamping ORUs, and occasionally for pilot research (if not covered by other sources)
- Since 2015, the RIF has been used to fund Viterbi internal centers via a competitive process
  - 5 centers funded so far; no solicitations currently planned for the next year
- \$100,000/year fund
  - Not for faculty salary or teaching buyout
  - See memos & web site

Other vice dean offices may provide travel funds to meet with sponsors

# Contracts & Grants Administration



- **Central:** Dept. of Contracts and Grants (DCG), run by Jeri Muniz, under the VP for Research Randolph Hall; *submits ALL proposals*
  - Compliance with federal and other funding submission regulations
- **School-level:** Viterbi Business Office (VBO), *approves proposals before proceeding to DCG & submission*; Viterbi contact to DCG: Nichole Philips, Director of Viterbi Research Administration
- **Local/department-level:** Your dept. business manager, *prepares proposals and submits to VBO*
- These are services **BUT please:**
  - *Be mindful of people involved and timing expectations*
  - *Read the memos*
  - *Report problems to Nichole Philips*

# Overhead



- Overhead = indirect cost, facilities and administration
- 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)
  - External participant support (only 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
- Indirect costs can be cost-shared under appropriate conditions; this is an income loss for the school
- Some universities don't give it (e.g., MIT, Stanford)
- Some federal grant programs and some foundations require it
- All cost-share requests must be submitted through the on-line cost-share system at least 2 weeks prior to the proposal submission deadline (at least a month for centers)

# Viterbi Dissemination of Opportunities



- Weekly Research Gist
  - Funding opportunities
  - Local meetings/workshops
  - Research-relevant university announcements
- Comprehensive research portal:  
<http://viterbi.usc.edu/research/>
  - Funding opportunities
  - Faculty research topic database
  - Pre-award and post-award policies
  - University and Viterbi Initiatives
  - Research cores
  - Research-relevant resources



# Early Career & Young Investigator Awards



- Many agencies have early career awards: NSF, NIH, ONR, Army, Air Force, CDMRP, etc.
- Your odds of getting these are higher than for other types of grants
  - E.g., NSF CISE 20% funding rate for CAREER <10% for standard 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



- Almost all 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 Impact



- Federal agencies are increasing their 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
- USC and Viterbi have many resources...



# Research Centers

<http://viterbi.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 before tenure (e.g., Education Director, Outreach Director, etc.)

# Facilitating Centers & Large Proposals



- Center proposal coordination by Nichole Phillips
  - Graphics support
  - Grant writer/editor support
  - Grant writing training for Viterbi staff
  - Budget and admin support
  - Short-term teaching release
- Streamlined space request negotiation (Linda Rock)
- Streamlined cost-share procedures (on-line form)
- Interaction with the VP for Research
- (support for interdisciplinary=multi-school proposals)

# Viterbi Awards Office



- Role: to serve as a resource to Viterbi faculty and department chairs in nominating our Viterbi faculty for national and international awards, fellow and advisory committee opportunities
- Point of contact:
  - Branka Cvejic ([bcvejic@usc.edu](mailto:bcvejic@usc.edu))
  - If you feel ready to be nominated for an award, make sure to contact your department Chair, me, and/or Branka

# Awards Notification Tool



- Purpose: notification, tracking, and recognition of faculty awards
- **Faculty** enter their own awards on myViterbi site. Dept. chairs screen and distribute.
- Types of awards to be reported: best paper awards, society awards, fellowship distinctions, and national and international awards.
- No grants and contracts, with the exception of Early Career Awards/Young Investigator Awards/Pioneer Awards which are also distinctions.

# Viterbi Core Infrastructure Labs



[http://viterbi.usc.edu/research/shared\\_research/](http://viterbi.usc.edu/research/shared_research/)

- Shared labs with user fees:
  - CEMMA
  - Keck Photonics Lab
  - Rapid Prototyping Lab
  - RTH Clean Room
  - Machine Shop
- Programs:
  - Provost's Core Infrastructure Initiative
  - NSF Major Infrastructure Program (MRI)
  - DoD DURIP Program
- Disseminating infrastructure funding opportunities
- Networking with existing centers & institutes to leverage resources



# Corporate & Private Funding



- Corporate and Foundations Relations Office
  - Interim Director: Mike Orosz
- For foundations, work with Maria Zamora:
- Special RFPs with partnering companies (GE, Lockheed Martin)
- Establishing new partnerships
- IP negotiations can be lengthy...

# International and Industrial Partnerships



- International Collaborations (Vice Dean Raghavendra)
  - India: Infosys center with India
  - Korea: Korean Air and Korea Universities alliances
  - Pratt and Whitney Institute for Collaborative Engineering
  - See Viterbi Globalization site:  
<http://viterbi.usc.edu/academics/globalization>
- Industrial Partnerships (Mike Orosz)
  - CiSoft Center funded by Chevron; good model for other centers
  - AIRBUS --
  - KAGERIIC – Korean Air + General Electric Research Institute
  - Other possibilities – Northrop-Grumman, Boeing, AT&T/SBC

# Viterbi Research Initiatives



- Developing a school-level research vision; identifying major areas of interest, related to the NAE Grand Challenges (talk to your Viterbi Research Committee members), to inform hiring and internal investments
- Targets of active pursuit:
  - NSF ERC, STC, and MRSEC proposals
  - MURIs
  - NIH centers
  - DoE EFRC, DoD centers, EPA SCPC
  - Training grants (IGERTs, NSF REU & RET grants and sites)
  - Education, outreach, and broader impact
  - Globalization opportunities

# Some Viterbi Initiatives



- Energy
  - DoE EFRC in solar power
  - Leveraging the “intelligent energy” theme w/ ISI, partnered with So Cal Edison
- Engineering for Medicine & Health
  - NIH centers on autism and informatics
  - HET@USC (next slide)
- CS@SC
- Key societal challenges: safety and security, water resources, etc.
- NSF, DoEd, foundation and corporate opportunities
- Better ties with ISI and ICT, also Cinematic Arts (games+)

# Viterbi School of Engineering-Keck School of Medicine (HET@USC)



- A joint research and education program to bring together Viterbi and the Keck School of Medicine
  - Facilitating health-related research
  - Training doctors in research
  - Providing clinical links for engineering researchers
  - MD-PhD program, also new MS, minor, etc.
- Modeled after the MIT-Harvard Health Science and Technology (HST) Program; former head of HST, Prof. Martha Gray, consulted the effort, alumnus of the program, Prof. Terrence Sanger (BME) leads our effort
- Two major retreats (10/08 and 5/09), then smaller
- 1<sup>st</sup> HET MD class started in fall 2011
- New research collaborations being facilitated

# Average Expectations: The Dean's Vision



- At least 3 GRAs funded per year
- Fellowships and TAs are in addition to that
- 25% GRAs not allowed on grant budgets
- One PhD graduated per year, one new PhD student taken on
- 5 years in the PhD program per student: 1 as TA, one as fellow, and 3+ as GRA (no fixed order)
- Each faculty member should submit at least 2 proposals 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 (~10%) 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 after the elections (the DC Office will keep us informed)
- Basic advice:
  - Connect with program managers/administrators at federal agencies, go to visit, 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)
- Tracking proposal submissions
- Tracking research involvement (co-PI, senior/key personnel, student supervision, etc.)
- 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



# Resources for Junior Faculty



- Dedicated web portal under <http://viterbi.usc.edu/research>  
<http://viterbi.usc.edu/research/info/funding-opportunities-for-new-and-junior-faculty.htm>
- Fall orientation for junior and new faculty
- NSF Career award internal review program (2 reviews per proposal by previous winners)
- 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; 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 is best: [mahta@usc.edu](mailto:mahta@usc.edu)
  - Assistant: Marjorie Brownbill: [brownbil@usc.edu](mailto:brownbil@usc.edu)  
For appointments contact Marjorie
- 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!