

The Fu Foundation School of Engineering and Applied Science

Department of Electrical Engineering



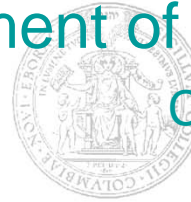
COLUMBIA UNIVERSITY

IN THE CITY OF NEW YORK

Graduate Student Orientation: Electrical Engineering & Computer Engineering

*Prof. Gil Zussman
MS Advising Committee Chair*



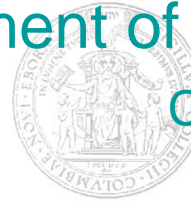


Outline of Today

- 10:00 - 1:00 Introduction
Overview of Courses
Libraries
Career Service
- 1:00 - 1:45 Lunch / student panel
- 2:00 - 4:00 Advising appointments
8 Open Labs
- Detailed schedule - in the folders
- Advising appointments - online

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Research Overview Day

- Friday, Sept. 9, 9:30 - 4:00 Davis Auditorium
- 21 faculty members will give 15 minutes presentations about their research
- Organized according to the areas
- Important in case you want to get involved in research projects
- Detailed agenda – in folders

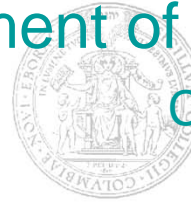


Columbia Electrical Engineering

- Founded in 1889 (at Thomas Edison's suggestion)
- Source of many inventions
 - Transatlantic cables (Pupin)
 - FM radio (Armstrong)
 - MPEG-2 DVD coding (Anastassiou)
- 22 faculty + joint appointments (CS, AP) + **adjuncts**
- Students:
 - ~100 undergraduates (juniors + seniors, including Comp.Eng.)
 - ~250 MS students
 - ~130 Ph.D. candidates

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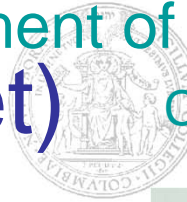
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EE Department

- 5 main focus areas:
 - Networking and Communications
 - Signal and Information Processing
 - Integrated Systems / Circuits
 - Microelectronics Devices, Electromagnetics, Photonics, and Plasma Physics
 - Systems Biology
- 5-10 faculty per area (including overlaps and joint appointments)

Recent Initiatives (subset)



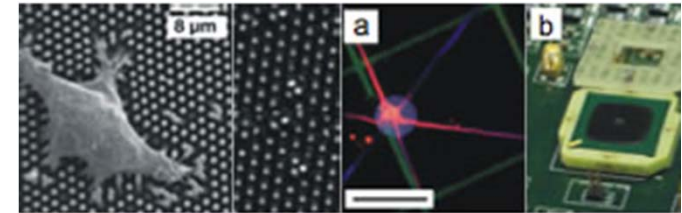
- New DOE Energy Frontier Research Center on Photovoltaic Technology

- 5 years, \$19M, Yardley/Heinz EE, Brus Chemistry (PIs), Kymissis, Osgood, Shepard in EE and others as co-PIs
- Improve photovoltaic efficiency through fundamental understanding and molecule-scale control of the key steps in the photovoltaic process in organic and hybrid materials



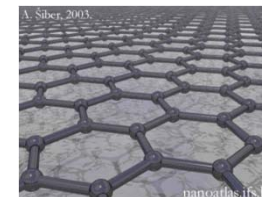
- NSF Center on Optical Techniques for Actuation, Sensing, & Imaging of Biological Systems

- 5 years, \$3M, Shepard EE (PI) and 19 faculty members from 9 departments, 6 schools
- optical methods for biosensing and bioimaging, on-chip biological sensor systems using nanoscale device fabrication capabilities

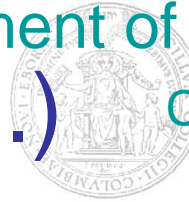


- DOD MURI on Graphene Research

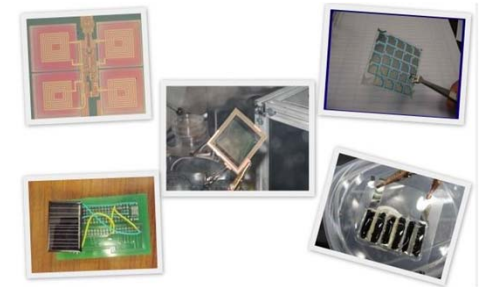
- 5 years, \$7.5M, Osgood EE (PI), with Mech E, Physics, Chemistry and Cornell U co-PIs
- explore the unique properties of graphene and new device applications



Recent Initiatives (contd.)

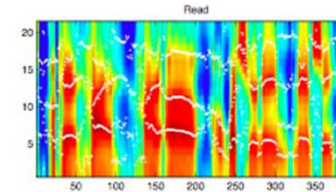
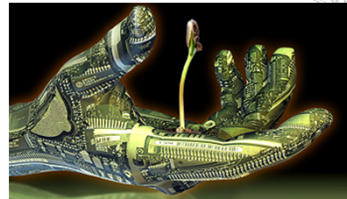


- Energy Harvesting Active Networked Tags for Disaster Recovery
 - Winner of Vodafone Foundation's "Wireless Innovation" competition, new NSF grant
 - Collaborative effort between EE and CS
 - Energy harvesting tags, ultra low power communications, tracking/locating survivors
- Photonics and optical interconnect networks
 - New DOD/DARPA/NSF ERC grants, PI Bergman (EE), co-PIs Zussman (EE) and Carloni (CS)
 - High-performance computing systems, fast future Internet, cross-layer optimized access networks
- Media Informatics
 - DARPA/ONR/NGA/NSF/DOJ grants, large-scale multimedia analysis and search, Chang, Ellis (EE), Attinger (ME), Kender (CS), Sajda (BME)
 - Media NYC 2020 by NYC Mayor office, Columbia STV, EE, CS, NYU-Poly
 - Connect media industry and university research in new media areas

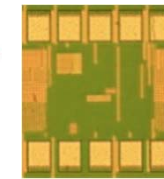


EE Strategic Strength Areas

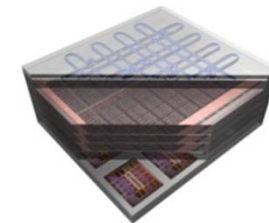
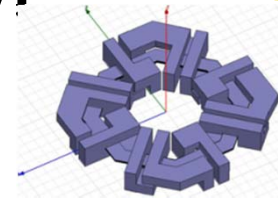
- **Systems Biology & Neuroengineering**



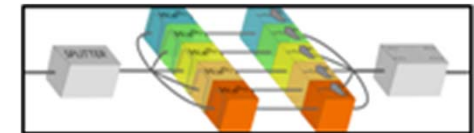
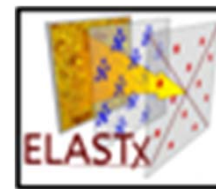
- **Media Informatics & Communication Systems**



- **Energy Harvesting, Efficiency, & Sustainability**



- **Ambient Intelligent Cyber-Physical Systems**





EE/CE MS Program

- 30 credits total
 - all at 4000 level or above, with some further exclusions...
 - min. 15 credits at 6000 level (CompEng: all in EE or CS)
 - EE: min. 15 credits in EE or CS (min. 10 credits in EE)
 - CompEng: min. 15 credits from “core” (min. 6 in EE and CS)
 - max. 6 credits for research projects (CompEng: max 9 credits)
 - max. 3 credits outside science/engineering
- Normal load: ~12 credits/semester
 - i.e. 3 semesters to complete MS
 - Fall/Spring/Fall or Fall/Spring/Summer
 - **DHS limits** for I-20 etc... refer to Columbia ISSO



MSChecklist2009.pdf (application/pdf Object) - Mozilla Firefox
http://www.ee.columbia.edu/pdf-files/MSChecklist2009.pdf

MASTER OF SCIENCE DEGREE PROGRAM WORKSHEET
COLUMBIA UNIVERSITY
ELECTRICAL ENGINEERING

Student: _____
(please print)

UNI: _____

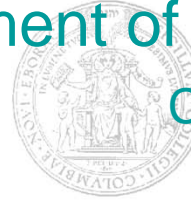
CHECKLIST

Courses	Pts.

M.S. degree requirements are as follows:

1. ____ 30 points of credit
2. ____ 15 points at or above 6000 level
3. ____ no credit for \leq 3000 level courses
4. ____ 2.5 GPA minimum
5. ____ 15 points in EE or CS

(5c) ____ 10 points in EE



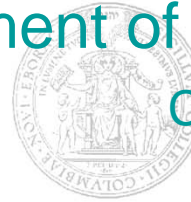
Concentrations

- MSEE can have an **optional** ‘concentration’
 - a particular set of co-ordinated courses to cover a certain field
- Bulletin lists several options
 - Multimedia Networking, Telecommunications Engineering,
 - Media Engineering, Lightwave Engineering...
- These are **just suggestions!**
 - You are free to put together your own program
 - **Depth-area Roadmaps** indicate dependencies, sequences



Advising

- Individual's MS program is supervised by
- **faculty advisor**
 - any EE faculty member
 - ideally, work with a single faculty in your area of interest
- Meet with advisor (at least) once per semester to approve pre-registration
 - ... but a useful resource for other topics
 - Today – 2pm



Research

- MSEE program allows up to 6 units of research
 - ELEN E4998/ELEN E6001
 - typically 3 units/semester max.
 - (CompEng: 9 units)
- Requires **faculty supervisor**
 - .. a significant time commitment
- No formal structure
 - .. just need to establish a relationship
 - .. e.g. through coursework
- Open labs today are a good source of information



Doctoral Qualifying Exam

- Oral/written exam **required** of students on Ph.D. track
 - MS students **may** take as evidence of their abilities
 - .. but they must still apply to the Ph.D. program (and be accepted)!
 - .. which means finding a willing Ph.D. **supervisor**
- Held in January every year
 - best taken at earliest opportunity
- Written exam covers undergraduate-level **material** at graduate-level **sophistication**
 - 6 areas
 - more details on EE web site
- Oral exam consists of three 15 minute one-on-one interviews

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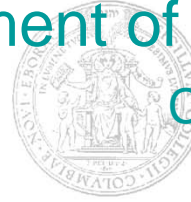


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Teaching Assistant and Grader Positions

- A limited number of Teaching Assistant and Grader positions are available
- Application form available in the website:
- http://www.ee.columbia.edu/pages/jobs/for_students/index.html



Information Resources

- EE, CE web sites
 - <http://www.ee.columbia.edu/> <http://www.compeng.columbia.edu/>
- MSEE Information Resources
 - <http://www.ee.columbia.edu/~dpwe/ms/faq.php3/>
includes links to: FAQ, curriculum roadmaps, bulletin lists, etc.
- The SEAS Bulletin
 - <http://www.engineering.columbia.edu/bulletin/>
- Ask the faculty/staff:
 - MS committee
 - Elsa Sanchez, Student Affairs Coordinator

