Frederick Seitz Materials Research Laboratory

Founded in 1962

"Perhaps what is most significant about materials research throughout its history is that, in parallel with the development of social organization and advances in the art of language, it tended to be the limiting factor in determining the rate at which civilization could advance."

Frederick Seitz

MRL Mission & Values

Education	Research	Service
Undergraduate/ Graduate/ Postdoctoral education and training	*House, support, and enable a thriving research portfolio*	*Empower the broader Materials community via our Facilities and Events*

MRSEC Awarded

- 6-year, $15.6M Award
- Funding for multiple seed proposals/year
- Potential for renewals
- 13 funded research faculty, plus education/outreach and future seeds
  - 4 MatSE
  - 4 MechSE
  - 2 Physics
  - 1 BioE
  - 1 ECE
  - 1 Chemistry

MRL Faculty: New Startup Activities

Thirteen new faculty since 2012, all w/faculty office, research offices and/or lab space

- ***8 of 13 starts are female –***
  (Women are 10 of 30 resident MRL faculty)

MRL Central Research Facilities

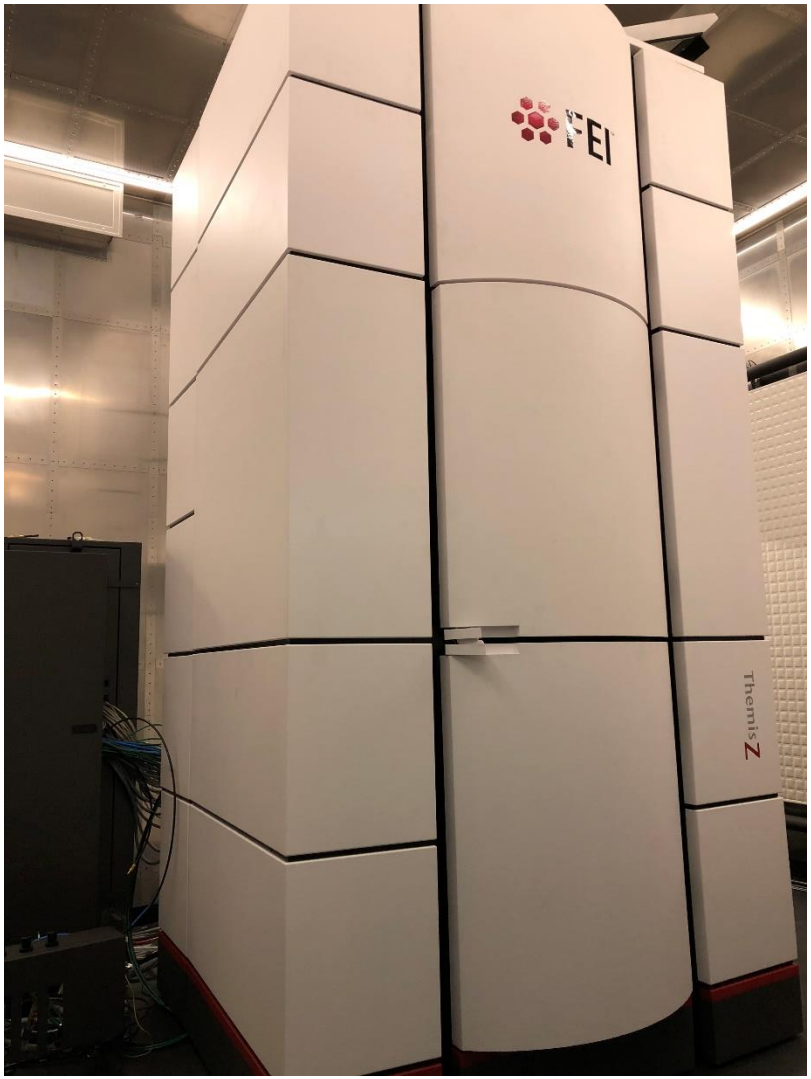
Goal: *To enable fabrication, growth, processing, characterization, and computation of all classes of advanced materials*

Key Statistics

- **Comprehensive** - ~$50M suite of tools
- **Available** - 24/7 open access with easy proposal submission
- **Expertise** - 18 technical staff members
- **Affordable** - Low self-usage fees; average ~$20/hr, highest is $45/hr

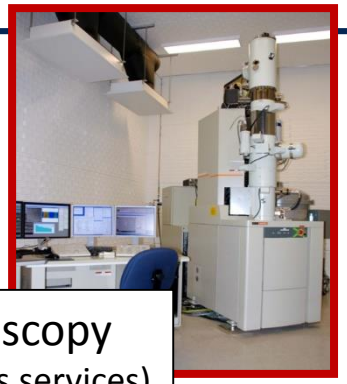
FY17 Usage

- 101,189 research hours by 1,034 users
  - UIUC: 98,307 hrs
  - Outside academic: 1,494 hrs
  - Industry: 1,389 hrs



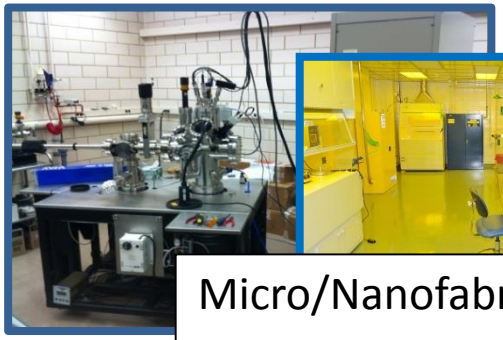
MRL – Central Research Facilities instrumentation cores

Goal: "To ***maintain*** and ***evolve*** the toolset enabling unsurpassed resources for Materials Fabrication, Characterization and Computation"



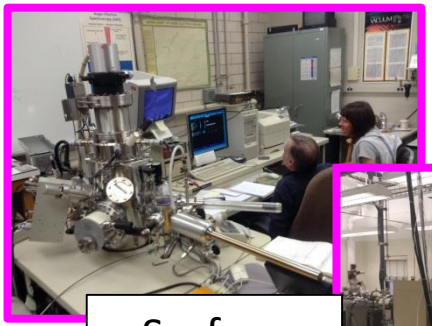
Electron Microscopy
(including bio analysis services)

Laser and Spectroscopy facility



Micro/Nanofabrication facility
(including mask fabrication services)

Scanning Probe Microscopy



Surface Analysis

Thermal Properties and Soft Materials

X-ray analysis

MRL Central Research Facilities

FY17 Usage by Department (Hours)

		CMM	Microfab	Total
COE	ECE	1,436	1,076	2,512
	MatSE	30,137	33,194	63,331
	MechSE	6,290	2,110	8,400
	Physics	2,689	4,080	6,769
	All COE Depts	**51,225**	**40,717**	**91,942**
SCS	Chemistry	4,065	1,332	5,397
	Chem E*	3,030	73	3,103
	Total Campus Use	**56,256**	**42,050**	**98,306**
Total Use				**101,189**

*also counted in COE

External academic use: 1,494 hours for $48,165
Industry use: 1,389 hours for $55,518

MRL Central Research Facilities

FY17 Usage Demographics:
Undergrads, Graduate Students and Postdocs/Visitors

FY17	Users		Hours	
Grad Students	577	56%	55679.0	55%
Undergrads	177	17%	11931.4	12%
Other researchers	281	27%	33578.6	33%
Total	**1035**		**101,189.0**	

Strong educational, training mission:
73% of the users are grad/undergrad students
who logged ~ 68K hours of research work in FY17

MRL Facilities: Training and Technique Development

Annual Characterization Workshop

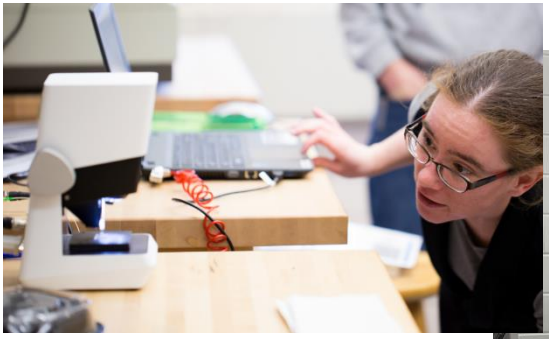
MRL Facility Staff Instructors and invited industrial presenters

- 11 years, every Summer
- >200 participants (160 local; 40 external)
- 25 corporate sponsors and exhibitors
- Simulcast to outside universities

Annual MRL Fall Conference

- 6th edition, Nov 8-9, 2017
- Speakers: Dean King and Profs. Boppart, Mason, Johnson and Leal
- 15 corporate sponsors

Soft materials nano-indentation workshop (IonOptix)



Hyperspectral IR microscopy workshop (DMS)

AFM workshop (Park Systems)

MRL Contributions to the Academic Mission

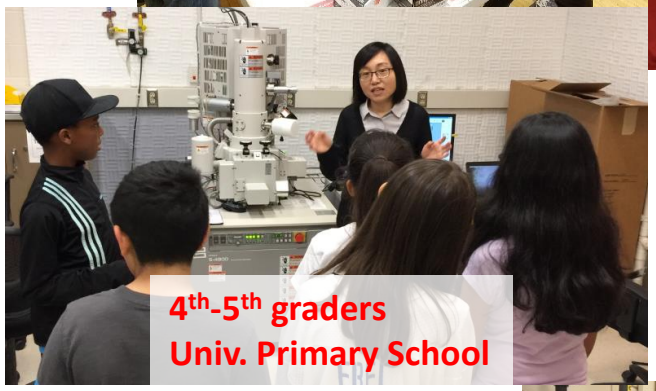
K-12 Outreach

- **University Primary School (4-5th graders)**
- **GLAM Summer Camp** (Girls Learning About Materials).
- **GLAM-mid** (GLAM for middle school participants)

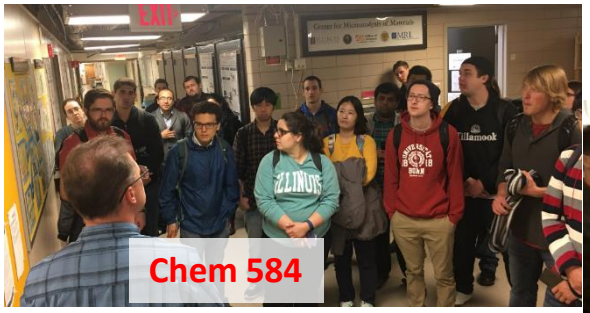
GLAM

Ugrad/Grad with lab demos in the MRL

- **ME 482 (Prof. AW Johnson, MechSE)**
- **Phys 403 (Prof. J. Boparai, Physics)**
- **AE 523 (Prof. Chasiotis, AE)**
- **MSE 404 (Prof. Zuo, MatSE)**
- **CEE 501 (Prof. Struble, CEE)**
- **TAM 456 (Prof. Hutchens, MechSE)**
- **ME 472 (Prof. Dunn, MecSE)**
- **MSE 481 (Prof. Huang, MatSE)**
- **LA 438 (Prof. McGuire, Landsc Architecture)**

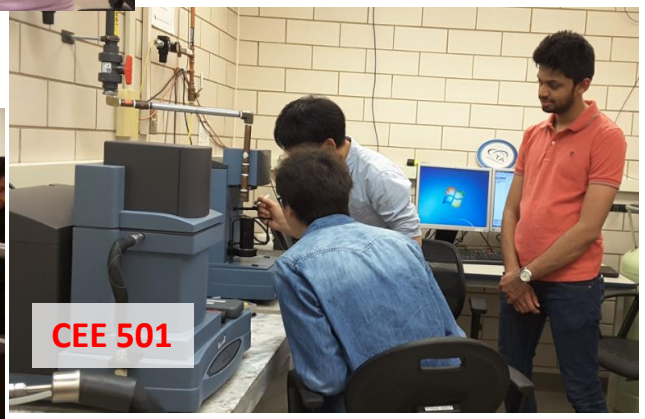


4th-5th graders
Univ. Primary School



Chem 584

Landscape Architecture



CEE 501