

Industry/Corporate Engagement

The School of Materials Science and Engineering is committed to engaging with Industry through a variety of mechanisms that create win-win situations for companies and for Georgia Tech. As a School, we are leading the way in educating our students with experiences that go beyond the classroom, and are both experiential and innovative. Along this path, we are looking forward to creating mutually beneficial partnerships with industry. Together, we can advance the future of knowledge and at the same time generate a new cadre of engineers and scientists who will be tomorrow's leaders ready to compete in a globally engaging environment.

Industry relations with MSE involves **corporate engagement** through opportunities for brand recognition, access to students, sponsoring capstone design or other projects, and nurturing and cultivating students for possible co-op, internships, and employment, and well as collaborative **philanthropic and sponsored research** aimed at creating new and innovative technological solutions accelerating the pace from discovery to deployment of materials.

Educational Support

Level 1 Corporate Engagement (\$3,500) includes all standard services

Level 2 Corporate Engagement (\$8,000) includes all standard services and one additional service

Level 3 Corporate Engagement (\$14,000) includes all standard services and two additional services

Standard Services

- MSE Career Fair and Resume Book
- Corporate Day or Information Session in MSE
- Industry Day Events
- MSE Mentoring Program
- Digital and Print Marketing Support
- Assistance with MSE Student Organization Meetings (Fall or Spring semester)

Additional Services

- Senior Capstone Design Project
- Undergraduate Research Scholarship
- MILL Summer Fellow
- MILL Learning and Discovery (L&D) Teams
- Student Organization Activities

Connect with MSE

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Industry/Corporate Engagement

Materials Science and Engineering: The Discipline

Materials Science and Engineering (MSE) is an **enabling** discipline. Graduates with an MSE degree participate in interdisciplinary teams to guide the selection of materials, or work as process engineers to design and create materials using processes employing environmentally friendly, low-cost, sustainable manufacturing approaches, with strategic use of raw materials and natural resources. They are quality control experts with skills in microstructure characterization and measurements of properties of materials, and lead R&D efforts based on their understanding of process-structure-property-performance relationships enabling discovery of new materials or their deployment in novel applications.

MSE at Georgia Tech is one of the largest materials department with top-ranked graduate and undergraduate programs. Our graduates are critical thinkers and problem solvers. Their curriculum-plus education, hands-on training, and social skill-sets, empowers them to work in any science and technology sector including aerospace, biomedical, electronic, energy, environment, health and human welfare, infrastructure, security, and transportation industries.

RANKINGS

#2 Undergraduate Program
 #1 Public
 #8 Graduate Program
 #4 Public

*U.S. News & World Report annual rankings, 2019-2020

MSE at GT is diverse program focusing on all material forms including biomaterials, ceramics, composites, fibers, metals, nanomaterials, polymers, and textiles for addressing societal challenges in energy, environment, health and human welfare, infrastructure, security, and transportation.

STUDENTS

364 (38%F/62%M) Total
 undergraduate enrollment

Scholarship Recipients: 137
 Co-ops & Internships: 52
 Average Starting Salary: \$70,000

192 (39%F/61%M) Total
 graduate enrollment

Federal Fellowships: 14
 Grad Internships: 18

Professional Organizations

- Material Advantage
 - ASM, Acers, TMS, AIST
- Materials Research Society
- Women in MSE

FACULTY

- 41 (20%F/80%M head count)
- 8 Joint Appointments
- 21 Courtesies/Adjunct

- 6 Regents Professors
- 39 Professional Fellowships
- 16 AFOSR/DOE/NSF/ONR CAREER/YIP Awards

- 3 National Academy Members
 - 2 NAE - US
 - 1 NAE China
 - 1 NAE Taiwan

Georgia Institute of Technology, School of Materials Science and Engineering
 771 Ferst Drive • Atlanta, GA 30332-0245

Standard Services

Career Fair

- Presence at MSE Career Fair
- Online access to student resume book
- Space for one-on-one interviews

Corporate Day or Information Session in MSE (Fall or Spring semester)

- Brand elevation and company awareness corporate day
- Classroom space or lobby in Love/MRDC atrium

Industry Day Events

- Complimentary Silver sponsorship and judging of MSE Poster Competition (Spring)
- Dedicated room/space for meeting with and/or interviewing MSE students (Fall)

MSE Mentoring Program

- Early contact with top-tier students who will become the future leaders of the industry
- Direct influence, observation, and evaluation of student talent for potential future hires
- Student exposure to the corporate culture and benefits of employment with sponsor

Digital and Print Marketing Support

- Display of your marketing materials for job openings and other events
- Visibility through MSE communication with signage (logo) displayed on MSE website, industry day and poster events and annual newsletter

Assistance with MSE Student Organization Meetings (Fall or Spring semester)

- Sponsoring events with student groups to promote leadership skills



Additional Services

Senior Capstone Design Project

Sponsorship of Capstone Design Projects providing students the opportunity to work with real world, open-ended, interdisciplinary challenges provided by industrial and research institution sponsors. Students learn and apply the engineering design process, define functional requirements, conceptualize, analyze, identify risks and countermeasures, and select materials and prototype. Benefits include opportunities for student mentoring and recruiting; potential fresh and out-of-the-box solutions – designed and tested by a student team during one semester's worth of effort; display of company logo at McCamish Pavilion for Capstone Design Expo; display of company logo on MSE Capstone Design Website, and in annual MSE newsletter.

Undergraduate Research Scholarship

Sponsorship of Undergraduate Research Scholars to gain hands-on experience under the direction of a faculty mentor working on an ongoing project in an area of interest to the Corporate sponsor. Benefits include increased corporate visibility and opportunity for recruiting interns/co-ops/ employees; mentor/nurture future leaders of industry; direct observation and evaluation of student talent to identify potential future hires; student exposure to corporate culture; low cost investment with potential for building relationships with MSE faculty, and invitation to Research Scholars' Presentation during annual Industry Day Event with pre-viewing and meeting with scholars prior to main event; and display of company logo on MSE website and annual newsletter.

MILL Summer Fellow

Sponsoring a MILL Summer Fellow will cultivate future recruits who are skilled in the use of various processing and analytical equipment common to the MSE discipline. These students are our future technical and executive leaders as they are asked to manage the day-to-day operations of a user-facility, develop new equipment protocols, train users, and lead new program initiatives. Through this innovative summer experience these students gain valuable hands-on technical, leadership, and people skills.

MILL Learning and Discovery (L&D) Teams

The Mill Learning and Discovery teams include a group of like-minded students who have a curiosity based on a challenge that they may have read about, learned about from an industry mentor, or encountered during an internship/co-op or other experiences. The groups self-organize as a team and work on various aspects of the challenge to enhance their degree and gain additional skill sets.

Student Organizations Activities

Sponsorship of club events or for students to travel to professional conferences and other meetings for members of Graduate Student Advisory Group, Undergraduate Student Advisory Council, Women in MSE, Materials Advantage, Materials Research Society, Student chapters of ASM, Acers, TMS, AIST, and other materials organization.

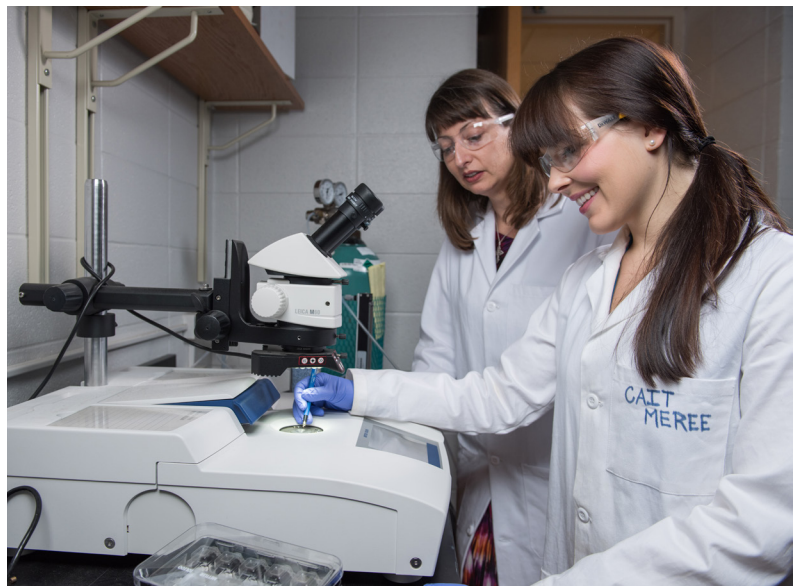
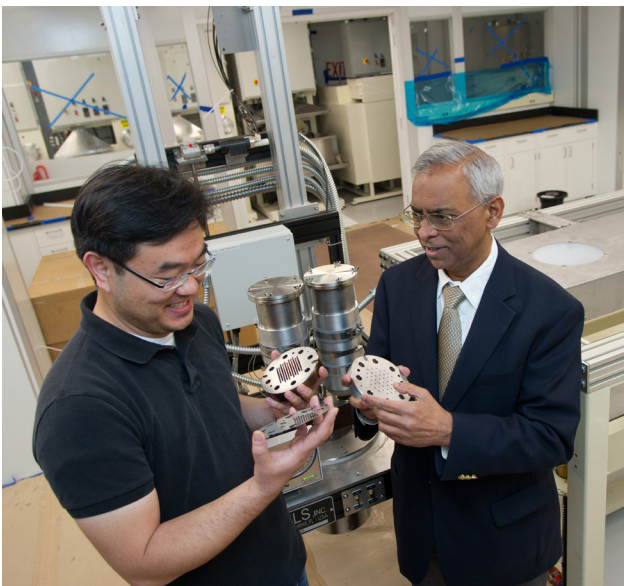
Philanthropic Support for Student and Faculty Fellowships (without deliverables)

Sponsor a Graduate Student Fellowship

- **~\$50,000** to attract a top graduate student to work on his/her Ph.D. with a faculty advisor in an area of interest to the sponsor. The fellowship amount includes a student stipend of ~\$30,000 and ~\$20,000 for tuition.

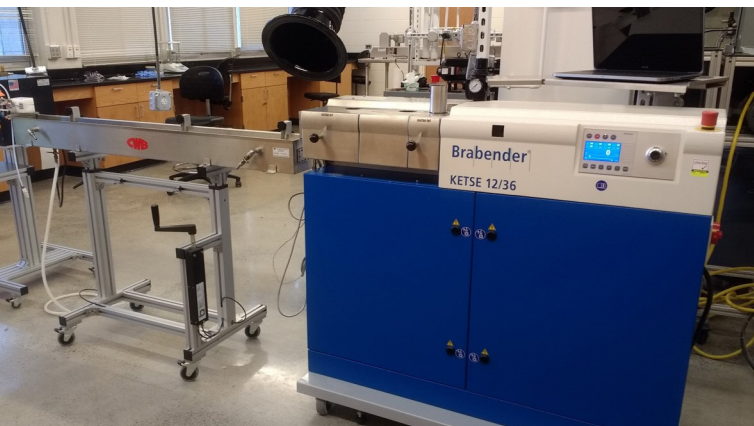
Sponsor a Faculty Fellowship

- \$70,000 to engage a faculty and promote their research in an area of interest to the sponsor. The Faculty Fellowship provides discretionary funds to the faculty member for use towards their partial salary, graduate student stipend, and/or materials, supplies, travel, or other expenses associated with their research.



Sponsored Research Activities (with deliverables)

- Engagement of a faculty member for research on a particular topic with deliverables as part of project requirements, is through the sponsored research program. Typical cost for a 12-month project is ~\$100,000, which covers approximately one month of faculty salary, an annual stipend for one graduate student (plus tuition) or part-time salary for a post-doc, materials and supplies, travel, and indirect costs.
- Sponsored research programs can involve various types of agreements depending on the nature of research. Examples of the different possible agreements, per Georgia Tech guidelines, are described below:
 - **Basic Research Agreement:** Explore fundamental challenges in a technical area - This form of research is typically driven by scientific questions that lay the foundation for technological progress that spur business growth. A Basic Research agreement can provide the industry partner the opportunity to license the resulting intellectual property (IP).
 - **Applied Research Agreement:** *Identify solutions to real-world challenges and overcome practical challenges* Under the Applied Research agreement, the company pays a defined fee to gain access to IP that is generated during the project and obtains rights for exclusive access to the IP for a specified period within a defined field of use. Industry partners are able to develop and launch a product with very low risk, gaining a first-mover advantage. After the exclusivity period is over, the company can extend the exclusive rights or convert to a non-exclusive license. Georgia Tech offers expertise and state-of-the-art equipment that can be leveraged in the final stages of development to test products and help a company ensure that they are market-ready.
 - **Demonstration Agreement:** Improve an existing technology - The Demonstrative agreement offers a straightforward and advantageous intellectual property policy for industry partners. When a company introduces background IP under a Demonstration project, the company has exclusive rights to any improvements at no additional cost. For companies that have licensed a Georgia Tech innovation, any improvements to the licensed IP shall be incorporated into the terms and conditions of the original licensing agreement.
 - **Specialized Testing Agreement:** *Test new and existing products* The Specialized Testing agreement provides a cost-effective and secure way for companies to access equipment without making a large capital investment. This work is often instrumental in enabling a successful product launch. The Specialized Testing agreement also offers a straightforward intellectual property policy for industry partners. The sponsoring company will own all test results.



For more information, contact Donna Peyton
Director of Corporate Development, MSE and ChBE,
404.894.0987 or donna.peyton@chbe.gatech.edu

About Research in MSE

Research in MSE focuses on all classes of materials - metals, ceramics, polymers, fibers, textiles, composites, nanostructures, and bio-enabled/biomimetic materials. The state-of-the-art is the integration of various materials in systems, devices, and components based on their unique and specific properties. It involves synthesis and processing in the form of nanoparticles, nanofibers, and nanolayered structures; coatings and laminates; bulk monolithic, single-/poly-crystalline, glassy, soft/hard solid, composite, and cellular structures. It also involves measurements of material properties, often under extreme conditions, characterization of structure across atomic to macroscopic length scales, and multi-scale predictive and discovery based modeling and computations. Individual and interdisciplinary research projects involve developing methodologies to stretch the limits of performance of existing materials, or envisioning, predicting, designing, and developing new materials for performance specific applications utilizing sustainable processes and strategic use of materials. Advances in technology require materials with multiple functionalities, prescribed forms, and properties customized for specific applications and performance requirements.

MSE Faculty are organized into three Topical Working Groups (TWGs) representing the major research thrust areas and focusing on different approaches, applications, and challenges.

Functional Materials faculty work on electrical, magnetic, and optical properties of metals, ceramics, polymers, semiconductors for applications relevant to societal challenges in telecommunications, security, energy, and environment. Examples include active materials, nanogenerators, self-powered and electronic packaging devices, sensors, and new dielectric materials; electrodes for next generation fuel cells, batteries, super-capacitors, solar devices; time-resolved characterization and modeling of interactions across interfaces and effects of structure and defects on transport and electrical properties.

Soft/Bio Materials faculty work with polymers, fibers, and biomaterials for applications relevant to challenges in health and human welfare, energy, environment, flexible electronics, and transportation. Examples include bioenabled and bioinspired materials; sensors and bioelectronics devices; pharmaceuticals and targeted drug delivery; medical textiles that help with patient care or packaging materials that provide better food safety; and orthopedic implants, biomarkers and biosensors, and methods for tissue fixation or bone repair.

Structural Materials faculty work on load-bearing structures for applications relevant to challenges in infrastructure, security, and transportation. Examples include corrosion of metals in gas pipelines, power plants, and paper industries; design of light-weight metals, ceramics, and composites for transportation (automotive and aerospace) and infrastructure; aging, degradation, and life cycle prediction of materials from various failure mechanisms under extreme environments; materials for protection and defeat; and coatings, sensors, and monitoring systems to prevent catastrophic failure.

About the MSE Major

Bachelor of Science Degree in MSE:

132 credit hours total

- 21 hours in concentration
- 6 hours of capstone design

Concentrations

- Biomaterials
- Polymer & Fiber Materials
- Structural & Functional Materials

Options

- Co-Op
- Research
- Study-abroad
- Business

Minor in MSE

BS+MS in MSE

Master of Science in MSE

Doctor of Philosophy in MSE

Requirements:

2 core courses

- Thermodynamics
- Structure of Materials

1 Seminar Course

5 elective courses

3 Minor Courses

Qualifier

Proposal

Dissertation defense

Options to pursue

- Internship
- Entrepreneurship
- Teaching Practicum



Senior Capstone Design

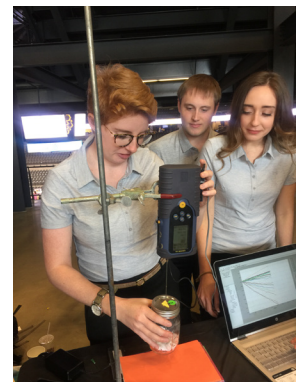
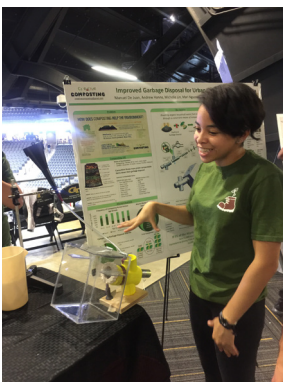
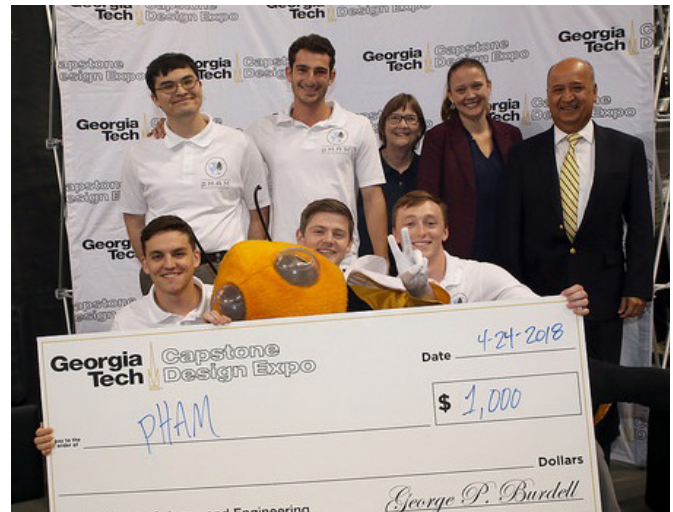
Capstone Design is an undergraduate culminating course required for graduation. Students work in teams to design, build, and test prototypes with real world applications. At the end, students showcase their efforts at the “Capstone Design Expo.”

Capstone Design provides students the opportunity to work with real world, open-ended, interdisciplinary challenges proposed by industrial and research project sponsors. Students learn and apply the engineering design process: define functional requirements, conceptualize, analyze, identify risks and countermeasures, and select material and prototype.

Common examples of MSE Capstone design projects include the design of material formulation or compound for certain functionality, design of a process to produce material and the effects of process variables on resulting structure, or the design of a characterization protocol to understand material response and the correlation with properties. An important aspect is the demonstration of the process-structure-property-performance linkage, which is a key aspect of the MSE discipline. The projects have strong hands-on component, and must be such that they can be completed in one semester.

Sponsoring a Capstone Design project is a low cost investment with the potential for valuable research outcomes. It is an economical method to tackle a technical challenge or explore new ideas without a large investment. Through weekly meetings or calls, sponsors have the opportunity to collaborate with, cultivate, and evaluate students for potential recruitment.

For more information regarding Capstone Design sponsorship, contact Mary Lynn Realff at 404.894.2496 or marylynn.realff@mse.gatech.edu or Krishna Parachuru at 404.894.0029 or krishna.parachuru@mse.gatech.edu.



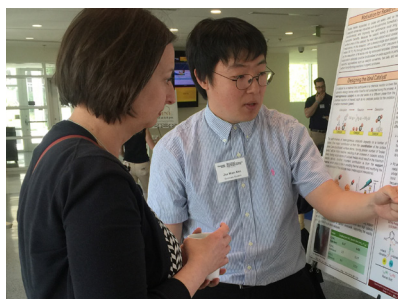
Undergraduate Research Scholars

Gain an organizational advantage while investing in the best and brightest students by sponsoring a first year MSE Undergraduate Research Scholarship. As a sponsor you identify the broad, general area of research, or the faculty whose research is of interest to you. Scholarship recipients are matched with faculty based on their interests and participate in research during the 10-week summer period following their freshmen year. Students gain valuable experience and the skill-sets to take with them for future internships or possible employment with the sponsor.

Corporate Benefits

- Increased corporate visibility and opportunity for recruitment
- Early contact with top-tier students attracting them to areas of interest to sponsor.
- Mentor and nurture the future leaders of the industry
- Direct observation and evaluation of student talent to identify potential future hires.
- Student exposure to the corporate culture and benefits of employment at sponsor site.
- Low cost investment with potential for valuable research outcomes
- Building strong relationships and opportunities for collaboration with MSE faculty.
- Develop new technologies and foster innovation for corporate success.
- Invitation to participate in annual Research Scholars' Presentation Event.

For more information regarding Undergraduate Research Scholar sponsorship, contact Mary Lynn Realff at 404.894.2496 or marylynn.realff@mse.gatech.edu.



» THE MATERIALS INNOVATION & LEARNING LABORATORY

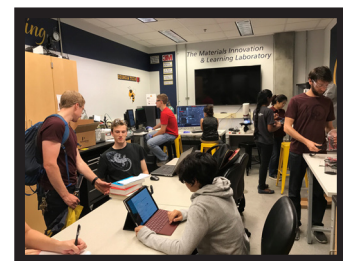
The Materials Innovation & Learning Laboratory (The MILL) is an open-access, student-run, make-and-measure space supported by the School of Materials Science and Engineering at Georgia Tech. The MILL provides peer-to-peer experiential education in the processing of materials, the characterization of material chemistry and structure, and the measurement of material properties.



MILL Summer Fellows manage MILL operations during the summer, enhancing the research experience of other undergraduates on campus and developing new programs that enrich The MILL's operations during the school year. They also provide K-12 outreach support in collaboration with other campus entities.

The MILL's Learning & Discovery Teams are student-run research projects that engage undergraduates in low-stakes, peer-to-peer research & design programs. Unlike most faculty-led research programs, L&D teams ask students to pursue their own scientific questions within a larger theme (e.g., "The materials science of art" or "3D Printing of Metals"). Projects are vertically integrated to include first year students to seniors, with more experienced members taking on leadership roles.

For more information regarding the MILL, MILL Summer Fellow Sponsorship or MILL Learning & Discovery Teams, contact Mark Losego at 404.385.3630 or losego@gatech.edu.



MSE Student Organizations

Material Advantage Chapter (ASM, TMS, ACerS) is comprised of undergraduate and graduate students of four materials professional societies (ASM, TMS, ACerS, and AIST). Combining academics with social activities, Material Advantage was established to broaden and enhance interdisciplinary scientific knowledge and collaboration between its members and professionals in the greater-Atlanta area.

The Materials Research Society is an organization of materials researchers worldwide that promotes communication for the advancement of interdisciplinary materials research and technology to improve the quality of life.

Phi Psi is a national professional textile fraternity. Its focus extends much further than the textile field to include polymers, fibers and other material-related fields. Chapter activities include hosting speakers and professional events, participating in service projects and planning social events for members.

Women in MSE (WiMSE) supports undergraduate and graduate women students of MSE by creating a platform for professional development, fostering supportive student and professional networks, and advocating for policies that support women students in materials science at the departmental, institutional, and professional level.

The MSE Undergraduate Student Advisory Council (USAC) represents the MSE undergraduate student body while promoting intra-department involvement. USAC provides feedback to the MSE faculty/administration and advocates on behalf of MSE to prospective students (undergraduate recruitment) as well as within the school to its student body. They also serve the student body by offering peers with advice, finding undergraduate research, networking, etc.

The MSE Graduate Student Advisory Group (GSAG) helps identify strengths and weaknesses of the School and makes recommendations for continuous improvements to the graduate program. GSAG hosts several important events such as poster sessions, tailgates and also plays a very active role in professional societies, recruitment, and student advocacy.

For more information regarding MSE student organizations, contact Renita Washington at 404.894.2852 or renita.washington@mse.gatech.edu.

Connect with MSE

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