MACROMOLECULES INNOVATION INSTITUTE
VIRGINIA TECH

JUNE 2021
e-NEWSLETTER

Message from the Director

Dear MII community,

We are excited to bring you the first edition of our new MII e-newsletter! This quarterly communication will become a resource for faculty, students, stakeholders, and anyone interested in macromolecular materials research at Virginia Tech. It will detail the latest updates, upcoming events and opportunities, and wonderful accomplishments that we would like to celebrate. We hope you will enjoy reading about our Institute, and we look forward to sharing more stories from you in the future.

Sincerely,

Robert B. Moore
Director, MII

MII News & Updates

Spring MII Faculty Meeting

The Spring 2021 MII Faculty meeting was held on Thursday, May 6th. With great participation from affiliated faculty all across the university, we discussed programmatic, research, and fiscal updates. The recording of that meeting is now available to MII faculty on our Faculty Resources webpage.

Seed Funding Opportunities

MII is offering two exciting opportunities for seed funding for collaborative, interdisciplinary research programs in FY2022. The first is the Interdisciplinary Collaborative Seed Program (ICSP), which seeks to enhance interdisciplinary collaborations and encourage student involvement. The second is the Industrial Partnership Enhancement Program (IPEP), which focuses on supporting industrial partnerships and stimulate growth in industry-sponsored programs. More details are available on our MII seed funding webpage.

Journal Cover Display

MII faculty are invited to share their journal cover art, to be displayed in Davidson Suite 313. This is a great way to showcase our prestigious publications! Cover art files may be sent to vrhenson@vt.edu.

Faculty News

GlycoMIP award from NSF fosters the next generation of glycomaterials science

GlycoMIP
NSF Materials Innovation Platform

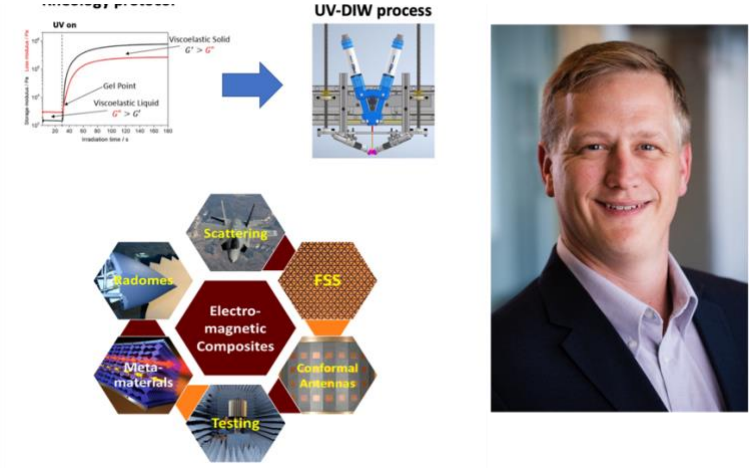
MII faculty who are currently involved in GlycoMIP (from top left) include Maren Roman, Alan Esker, Kevin Edgar, Sanket Deshmukh, Blake Johnson, John Matson, Robert B. Moore, and Michael Schulz.

The National Science Foundation has awarded nearly $23 million for a Materials Innovation Platform called GlycoMIP. Led by **Maren Roman**, who is an affiliate of MII, this platform is designed to elevate the study of glycomaterials, a critical yet underdeveloped area of polymer science. It will provide access to advanced facilities and expertise, as well as conduct in-house research. As part of GlycoMIP, Virginia Tech researchers are collaborating with the University of Georgia's Complex Carbohydrate Research Center (CCRC), and have research partnerships with Brandeis University, Rensselaer Polytechnic Institute, and the University of North Carolina at Chapel Hill.

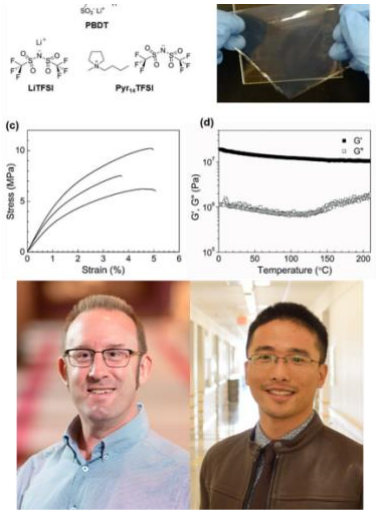
Read the MII Intersections Magazine cover story here.

Awards from ARL & ONR highlight additive, composite manufacturing

MII affiliate **Michael Bortner**, Associate Professor in Chemical Engineering, is the PI on an Army Research Lab (ARL) cooperative agreement with a $3.8 million ceiling with Virginia Tech researchers in support of the Army's Modernization Strategy and Essential Research Programs. Bortner is also the co-PI on a $3.8 million Office of Naval Research (ONR) Manufacturing Engineering Education Program (MEEP), focusing on Advanced Manufacturing of Composites.



DOE project investigates major development for lithium batteries



Louis Madsen & Feng Lin

To improve the safety and efficiency of lithium batteries, **Louis Madsen** and **Feng Lin** are leading an investigation into a novel type of lithium conductor that exists as a solid electrolyte, as opposed to the typical liquid form found in such batteries. This new material belongs to a recently discovered category of polymer electrolytes, termed molecular ionic composites (MICs). The project, a total of $1.25 million funded by the U.S. Department of Energy, seeks to document and analyze the chemistry of this new solid lithium electrolyte, in the hopes of paving the way for it to eventually be adapted for commercial use.

(Image from the 2021 Yu et al. paper in Advanced Energy Materials https://doi.org/10.1002/aenm.202003559)

REMADE award advances efficiency of tire retreading for commercial vehicles

Chris Williams, the L.S. Randolph Professor in mechanical engineering, leads a team that was recently selected by the REMADE Institute to lead a $1.5 million project that will address deficiencies in the process of retreading tires. The team will fine-tune three-dimensional scanning technologies to collect data about the surface of a worn tire, allowing for algorithms to evaluate exactly which parts of the tread need to be added onto. The team will also work to design a new material that is both able to be selectively printed and can bond the new tread to the existing tire's surface. Then, they will create a system that uses industrial robots to "print" the bonding material onto the tire with no unnecessary waste.

Chris Williams

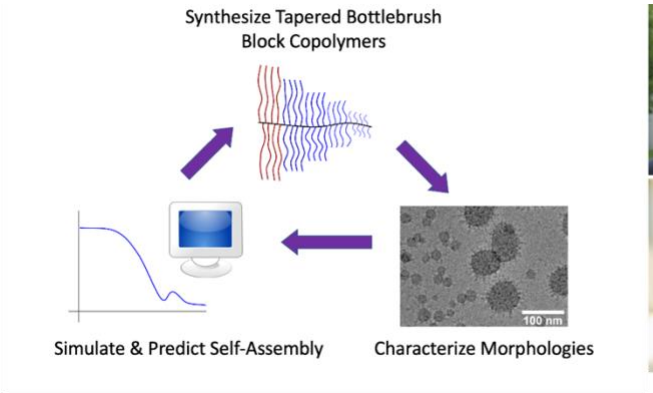
Tim Long

GOALI award to develop PEEK functional copolymers for blends and composites

A research team led by **Robert Moore**, a professor in chemistry and Director of MII, has been awarded $430K in funding through the National Science Foundation (NSF) Grant Opportunities for Academic Liaison with Industry (GOALI) and Critical Aspects of Sustainability (CAS) programs. The investigation will focus on poly(ether ether ketone), also known as PEEK, which is an engineering thermoplastic that is highly stable, and thus a promising candidate for end-of-use recycling. Researchers will use a new physical approach developed in the Moore research group to create functional copolymers, which are known to be beneficial as interfacial compatibilizers in polymer blends and composites.

NSF-BSF award focuses on bottlebrush polymers

John Matson (pictured top right), along with collaborators **Rana Ashkar** (pictured lower right; VT Physics) and Ronit Bitton (Ben Gurion University in Israel) has received a $440,000 award from the National Science Foundation focusing on the synthesis, aggregation, and characterization of unusual cone-shaped polymers termed tapered bottlebrush polymers. The award also comes with matching funding for Prof. Bitton from the Binational Science Foundation.

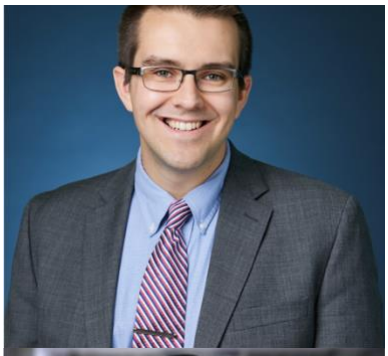


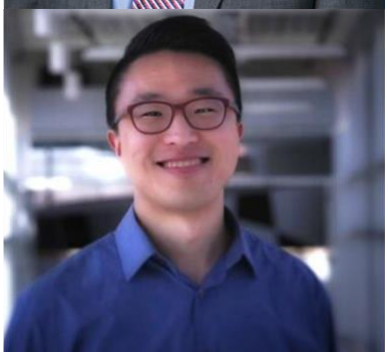
Rolls-Royce Professorship

Jack Lesko is a professor in the College of Engineering, and was recently awarded the Rolls-Royce Commonwealth Professorship by the Virginia Tech Board of Visitors. Read the VT News story here.

MII Student Highlights

Ryan Carrazzone was recently selected as a winner of the ACS Excellence Award, and presented at the recent ACS Excellence in Graduate Polymer Research Symposium.





Joseph Sarver was the lead author on two recently published papers. One appeared in the Journal of Applied Polymer Science (in which it was featured on the cover), and one in the Journal of Supercritical Fluids.

Dohgyu Hwang received the Peebles Award from the Adhesion Society, as well as the 2021 Adhesion Society Distinguished Paper Award. Dohgyu also had recent articles featured on the covers of Soft Matter and Nanoscale Horizons.

Education & Outreach

Newly Admitted MACR Students

A total of six new MACR graduate students will be joining our program in Fall 2021. After a virtual recruitment event in March, during which time these prospective students met with faculty and current students over Zoom and email, we are excited to finally welcome them to our campus in the fall!

Student Award Opportunities

Faculty are encouraged to nominate their students for the AMA scholarship (Adhesive Manufacturers Association Adhesive and Sealant Science), the John G. Dillard Travel Award, and the Jackson/Bostik Travel Award through MII. Calls for nominations will be sent out in summer 2021.

Events & Reminders

NGRPC 2021

The National Graduate Research Polymer Conference will be held July 26-29, hosted this year by Virginia Tech. It is the largest polymer student conference in the country, and for the first time in history, the proposal and steering committee to

host the event has been completely driven by MACR students.
We congratulate our students on their hard work.

View their website to learn more.

Solvay Seminar Series

The Fall 2021 Solvay Seminar Series will be held on Wednesdays at 11:15 am in Kelly Hall room 310. More details will be provided as the speaker list is finalized. We look forward to another great semester of talks, and sincerely thank the faculty, students, and guests who made our Spring seminars a success.

Find more details on our Solvay Seminar webpage.

POLY-co-PMSE Seminars

The Macromolecular Summer Seminar series will feature 36 expert faculty speakers from universities across the nation!

This event is open to everyone, but requires registration: REGISTRATION LINK

Additionally, the Young Professionals and Alumni Series will provide students with insight to the paths of chemists and materials scientists who have endured grad school and are now establishing, or have established their careers. This is also an excellent opportunity for students to form relationships and engage with successful professionals with diverse experiences and backgrounds.

MACR Course Syllabi

MII is in the process of collecting the syllabi of all MACR courses for our records, and for the benefit of prospective students. We will be contacting departmental staff in order to gather these syllabi, but you are also more than welcome to provide your syllabi by emailing them to mii@vt.edu.

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Discovery at the nexus of minds and molecules