BME ANNOUNCEMENTS

Weekly Newsletter to the Undergraduate Students

January 6th, 2020

Important Dates:

- BME Seminar Series - Sinan Keten
  Jan. 9th 4PM

- Last Day to Add a Class/Change section
  Jan 10th.

- No Classes - MLK Day
  Jan 20th

- Last Day to Drop a Class for Winter
  Feb 14th.

“Hell yes I do.”

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Biological materials excel at serving both static and dynamic mechanical functions. For instance, extracellular matrices exhibit high strength and toughness, which are considered diametric properties that are difficult to simultaneously optimize in man-made counterparts. Cells achieve tunable and reversible adhesion at interfaces through clever designs of adhesive proteins that employ functional conformational dynamics that no man-made system can replicate. Resolving controversy about how these functions emerge through multi-scale theory and simulations is critical to take these design concepts beyond the biological milieu. In this talk, I will present findings from our group’s inquiries along these directions into biological and bioinspired materials. I will first present our work on nanoparticle networks made from renewable cellulose nanocrystals (CNCs), illustrating how binary mixtures of nanocrystal lengths, and microstructural features such as a twisted plywood (Bouligand) lay-up of nanocrystals yield all-cellulosic transparent films with strength and toughness comparable to mineralized biomaterials. Second, I will discuss an efficient, molecular simulation informed metamodeling framework for designing polymer-grafted nanoparticle assemblies, revealing bioinspired interface designs that yield Pareto optimality between stiffness and toughness. Finally, I will conclude with insights from dynamical analyses on proteins that exhibit catch bonds, which are chemical interactions that counterintuitively become stronger when subject to large forces. Catch-bond inspired nanoparticle interfaces with soft modes that enable highly-tunable, tension-enhanced binding will be presented. Implications for medical and other practical applications of these materials will be discussed.
JOIN A NEW CLUB!

nanoNU

THE NORTHWESTERN UNIVERSITY NANOTECHNOLOGY CLUB

A new Northwestern club dedicated to exploring new and emerging nanotechnologies that is open to students of all majors!

INFO SESSION:
WED. 1/15 6PM
TECH L160

Interest form: https://forms.gle/9bVJ2LJDX3waFUpp7
2020 SRF Summer Scholars Program

Join the growing field of regenerative medicine by applying for a summer internship with SENS Research Foundation

Paid research opportunities are available at:

- Buck Institute for Research on Aging
- Harvard Medical School
- Sanford Consortium for Regenerative Medicine
- SRF Research Center
- Stanford University
- Turn Biotechnologies
- Underdog Pharmaceuticals

Apply by:
January 15, 2020

www.sens.org/summer-scholars
SENS Research Foundation’s Postbaccalaureate Fellowship Program trains recent graduates for a career in regenerative medicine.

Paid research opportunities are available at:

- Buck Institute for Research on Aging
- Sanford Consortium for Regenerative Medicine
- Stanford University
- SRF Research Center

Apply by: February 17, 2020

www.sens.org/postbacc-fellowship
THE APPLICATION FOR SUMMER UNDERGRADUATE RESEARCH (SURF) AT PURDUE UNIVERSITY IS NOW OPEN!

Don't forget to checkout the Pathways Program, which is a unique SURF cohort experience. This is a paid opportunity for underrepresented students to learn how a graduate degree can prepare you for different career pathways, including being a faculty member, working in a government setting/National Laboratory, Industry, and more! Briefly, we match you with a faculty mentor to conduct summer research culminating in a presentation at our end-of-summer symposium.

Receive:
- $4500 stipend, free housing, and travel expenses up to $500.
- Professional development seminars to prepare you for graduate school
- Additional mentoring as part of a growing support network

Applications are reviewed and matched to faculty mentors on a rolling basis, so it's very important that you apply as soon as possible. **Priority Deadline for the Pathways Program is January 15, 2020.** Applications received after this date will be considered until program is filled (Final deadline Feb 1, 2020)

Please review the website www.engr.purdue.edu/pathways for more information.