PLEASE POST

February 2019 Meeting

Northeastern Section
American Chemical Society
(NESACS)

Meeting
February 2019-Joint NOBCChE-NESACS Event
Sponsored By
The Broad Institute

Thursday – February 28th, 2019
The Broad Institute
415 Main Street, Cambridge Massachusetts 02142

4:30 pm – 5:30 pm NESACS Board Meeting

5:30 pm – 6:30 pm Social Hour

6:30 pm – 7:30 pm Dinner

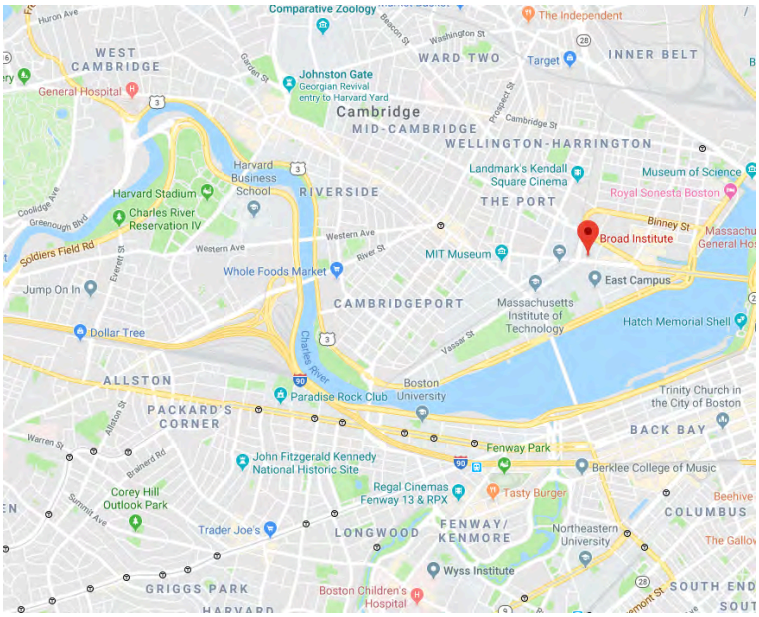
7:30 pm – 8:15 pm Monthly Meeting Featuring Dr. LaShanda Korley, Distinguished Associate Professor, Department of Materials Science and Engineering, College of Engineering, University of Delaware.

YOU MUST REGISTER IN ADVANCE TO ATTEND THE MEETING: THERE IS NO REGISTRATION FEE TO ATTEND THE MEETING; DINNER RESERVATIONS ARE REQUIRED. PUBLIC IS INVITED

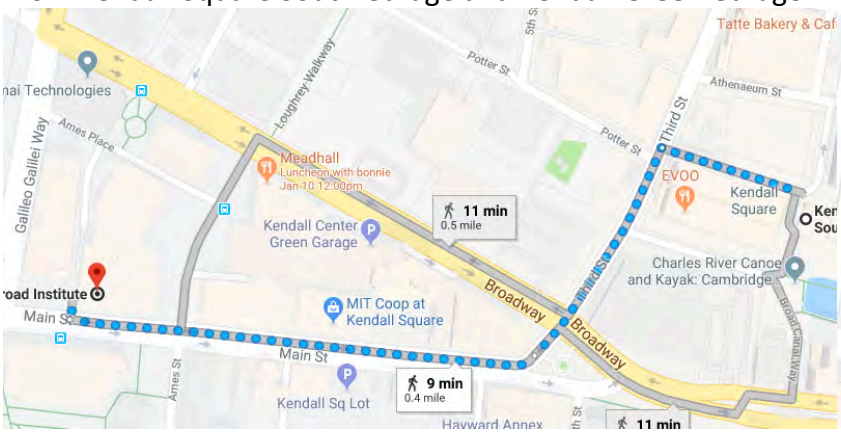
- For those who would like to join us for dinner, register by noon, Thursday, February 21, at https://lashanda-korley.eventbrite.com. Cost: Members, $30; Non-members, $35; Retirees, $20; Students, $10. Dinner reservations not cancelled at least 24 hours in advance will not be refunded. For additional information, contact the Administrative Coordinator, Anna Singer, via e-mail at secretary@nesacs.org.
- If you wish to join us for this meeting and not eat dinner, please register by noon, Thursday, February 3, at https://lashanda-korley.eventbrite.com Select "Seminar only".
- Directions to Broad Institute: 1. From Route 90 take exit 18 toward Cambridge onto Cambridge Street for 0.6 miles 2. Turn right onto Memorial Drive and continue for 2.1 miles. 3. Make a U-turn at Wadsworth Street and continue for 0.2 miles. 4. Turn right onto Ames Street and continue for 0.2 miles. Turn left onto Main Street and continue for 300 feet; the Broad Institute will be on the

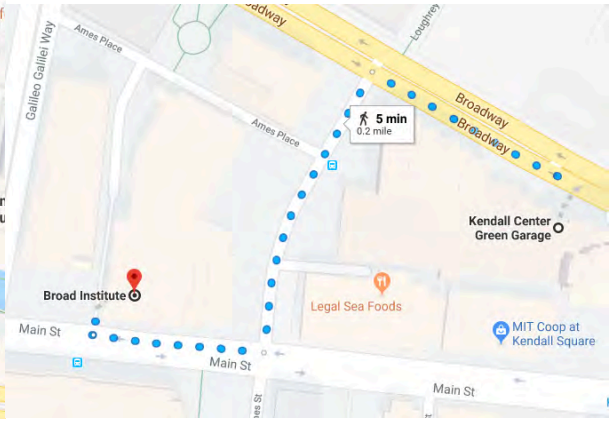
right. Parking is available for $10 after 4pm at Kendall Square South Garage (0.4 m) and Kendall Center Green Garage (0.2m).

- From Kendall Center Green Garage:
  5 min walk (0.2 m).



From Kendall Square South Garage and Kendall Green Garage:





If you have any questions or require additional information, contact the Administrative Coordinator, Anna Singer, via email at secretary@nesacs.org.

Dr.LaShanda Korley's Abstract and Biography:

Title: **Utilizing concepts of mechanics, transport, and assembly in Nature – towards responsive materials via strategic control of architecture and alignment**

Abstract:

Taking cues from biological materials, we are interested in understanding the design rules employed by nature and applying these strategies to the development of mechanically-enhanced and tunable materials.

Motivated by the pine cone, we have explored the fabrication of responsive composite systems utilizing high modulus, electrospun and low molecular gelators as fillers. Here, we discuss new insights into hygromorphic (e.g. hydration/humidity) response in composites utilizing concepts of interfacial assembly, transport, bias, and orientation. We have fabricated a strategically interfaced hygromorphic composite utilizing an active electrospun filler and a passive, low molecular weight gelator layer in an elastomeric matrix. The impact of material parameters on water front

progression and actuation were probed theoretically and experimentally in their design. Via this approach, preferential coiling was observed, although two challenges were encountered due to the isotropic nature of the PVA mat: (1) slow response times, and (2) non-uniformity in hydration-induced response. To overcome these challenges, we explored the impact of the alignment of the PVA electrospun fibers as a handle to control rate of hydration and program shape change. These engineered hygromorphic composites exhibited predictable curvature, and much faster response times (2 - 3 min). It is anticipated that these water-responsive systems may have unique applications in therapeutic delivery and chemical/biological protection.

Inspired by spider silk, we have designed a series of polymer-peptide polyurethane/ureas to explore the hierarchical arrangement critical to energy absorption and mechanical enhancement. We have developed chain-extended and non-chain extended peptide-polyurea hybrids with tunable secondary structure, modulating extensibility, toughness, and stiffness. The sheet-dominant hybrid materials were typically tougher and more elastic due to intermolecular H-bonding, while the helical-prevalent systems generally exhibited higher modulus. We have also explored the impact of a molecular design strategy that overlays a covalent and physically crosslinked architecture in these hybrids, demonstrating that physical constraints in the network hybrids influences hydrogen bonding and morphology. More recently, tailored physical associations within the soft and hard phases were engineered as a function of peptide content, leading to a rheological response dictated by block ordering and highlighting their potential as structural and injectable hydrogels. These structural features have enabled new thrusts in injectable gels and responsive actuators.

Biographical Sketch:

Dr. LaShanda Korley
Distinguished Associate Professor
Department of Materials Science and Engineering, College of Engineering
University of Delaware

LaShanda T.J. Korley joined the Departments of Materials Science and Engineering, and Chemical and Biomolecular Engineering at the University of Delaware (UDel) in January 2018 as a Distinguished Associate Professor. Prior to Prof. Korley's appointment at UDel, she held the Climo Associate Professorship of Macromolecular Science and Engineering at Case Western Reserve University, where she started her independent career in 2007. Taking inspiration from nature, her research program involves understanding the design rules employed by nature and applying these strategies to the development of mechanically-enhanced and tunable materials. Prof. Korley is the Principal Investigator of the recently awarded NSF PIRE: Bio-inspired Materials and Systems.

She received a B.S. in both Chemistry & Engineering from Clark Atlanta University as well as a B.S. in Chemical Engineering from the Georgia Institute of Technology in 1999. Dr. Korley completed her doctoral studies at MIT in Chemical Engineering and the Program in Polymer Science and Technology in 2005. LaShanda Korley was the recipient of the Provost's Academic Diversity Postdoctoral Fellowship at Cornell in 2005, where she completed a two-year postdoctoral appointment in the Department of Chemical and Biomolecular Engineering.