NSF Industry-University Cooperative Research Center (IUCRC)

Composite and Hybrid Materials Interfacing (CHMI)

Georgia Institute of Technology | OAKLAND UNIVERSITY | THE UNIVERSITY OF TENNESSEE KNOXVILLE

Comprehensive Solutions for Joining and Repair of Dissimilar, Composite, Hybrid, and Metamaterials.

www.iucrc-chmi.org

CHMI Academic Leadership

Georgia Institute of Technology (Lead)

- Christopher Muhlstein (Center Director & Co-PI)
- Donggang Yao (Site Director & PI)

Oakland University (Site)

- Sayed Nassar (Site Director & PI)
- Lianxiang Yang (Site Co-PI)

University of Tennessee, Knoxville (Site)

- Uday Vaidya (Site Director & PI)
- Dayakar Penumadu (Site Co-PI)
- Timothy Truster (Site Co-PI)

For additional information, please contact the Site Director or Program Managers at any of the CHMI institutions

- Donggang (Dong) Yao, Georgia Institute of Technology
  yao@gatech.edu
- Vanina Ghossein, The University of Tennessee, Knoxville
  vghossei@utk.edu
- Zhijun (Jason) Wu, Oakland University
  wu@oakland.edu

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Facilities & Asset at each CHMI site

CHMI members have access to a broad range of state-of-the-art facilities, assets and personnel at all three collaborating university sites of CHMI. That includes design, analysis, testing, characterization, modeling and simulation, innovations in manufacturing, advanced and hybrid materials to name a few. Please contact us for specific information on your area of interest.

CHMI Highlights

- Multi-materials (MM) and dissimilar materials (DM) joining is a critical need in all sectors.
- MM and DM joining of composites-metals-ceramics-polymers and hybrids are in need of practical solutions rooted in basic science.
- Three core CHMI partners are:
  - Georgia Institute of Technology
  - Oakland University
  - The University of Tennessee, Knoxville
- Technology sectors within CHMI
  - Aerospace, Automotive, Defense
  - Infrastructure, Wind, Healthcare
  - Sporting, Power & Energy
  - Oil & Gas

Technologies at Play

The technologies are driven by member partners / industry in addressing industry relevant needs. Examples of CHMI projects and future directions include, but not limited to

- Dissimilar materials joining – polymer composites, thermosets - thermoplastic, Metals to composites, composites to ceramics etc.
- Artificial intelligence (AI) in joints performance
- Discontinuous & continuous fiber composites joints
- Smart embedded sensors in interfaces
- High fidelity testing from nano to full scale
- Static & fatigue performance of composite joints
- Nondestructive testing, joints inspection
- Kissing debonds in sandwich structures
- Modeling & simulation prediction of joint strength
- Carbon fiber and hybrid composites joining
- Effect of sizing on joint design and performance
- Standardization of composite joints and repair
- Repair methodologies and high-rate manufacturing
- Work force development and training/education in advanced composites and interfaces
- Fastenerless joints, reversible joints
- Mechanical testing and test methods for conventional and unconventional joints
- Design and design of joints for manufacturing
- Ultrasonic, laser, mechanical, hybrid joining

CHMI Membership

❑ Full:	$32,500/year
❑ Associate:	$16,250/year

Membership Benefits

- Seat on the Industry Advisory Board (IAB) | Full member has 1 vote, Associate member has ½ vote)
- Steer and propose research projects of interest to industry
- CHMI technology roadmapping
- Access to pre-competitive and cutting-edge technologies
- Interact with potential employees
- Access to state-of-the-art R&D facilities and testbeds across all partnering university sites of CHMI
- Networking opportunities

Representative CHMI member companies (as of Oct. 2024)

- Air Force Research Lab
- DB Tech
- Delta Air Lines
- Dominion Energy
- Endeavor Composites
- Hexcel
- Hyundai
- IACMI-The Composites Institute
- Lockheed Martin
- Mussel Polymers
- One Power Company
- SensorData Technologies
- Smacar Solutions
- Syensqo (Solvay)
- and others…..