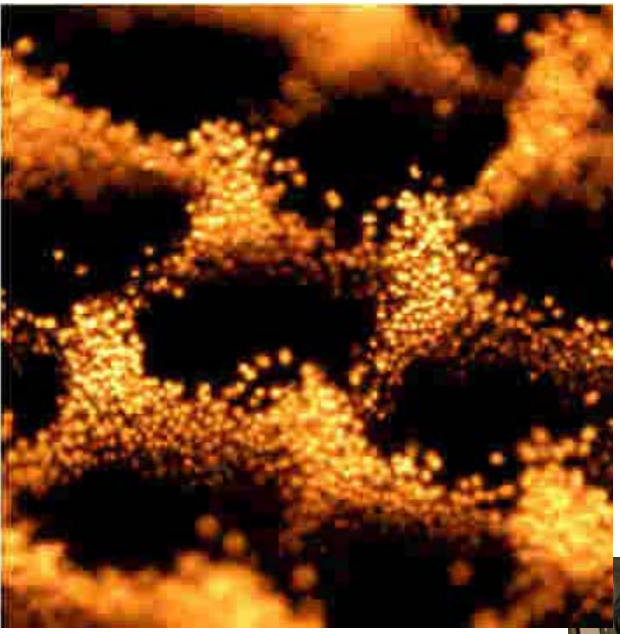
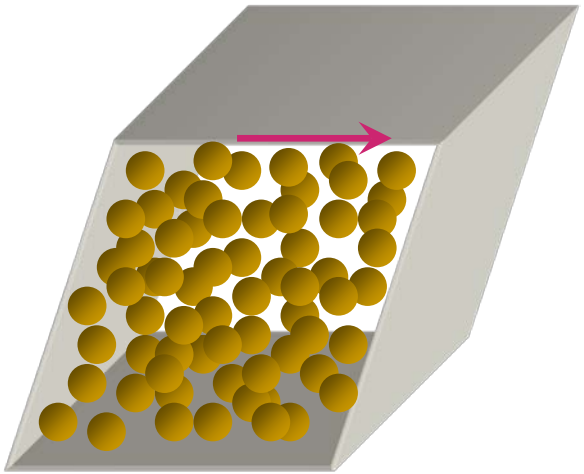
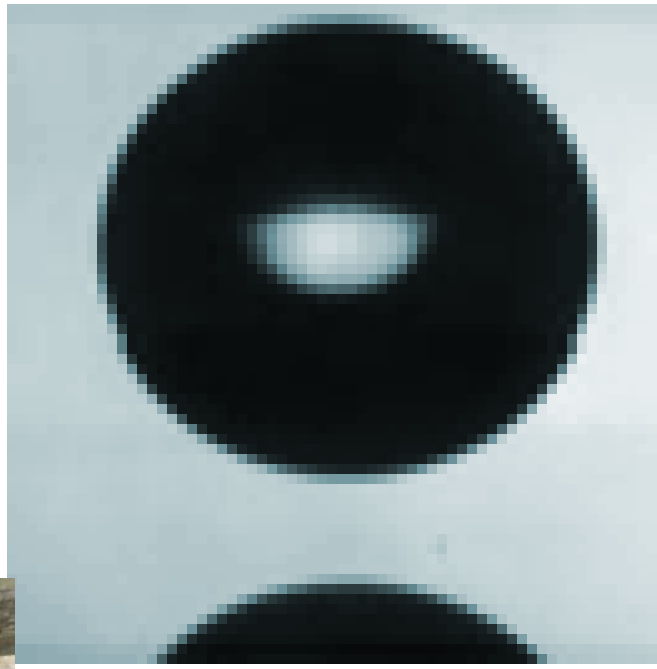
PREM: City College-Chicago MRSEC Partnership on the *Dynamics of Heterogeneous and Particulate Materials*







the City College of New York
OF THE CITY UNIVERSITY OF NEW YORK

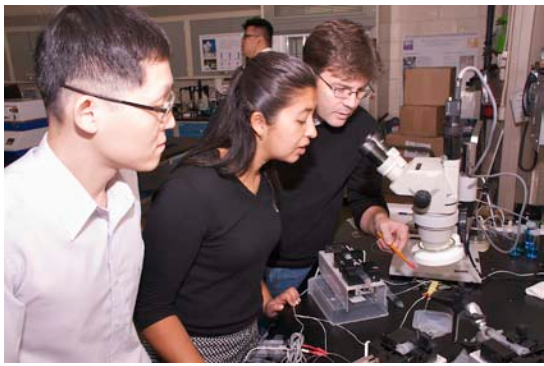
THE UNIVERSITY OF CHICAGO

City College of New York (CCNY)

- flagship PhD granting college of City University of New York (CUNY)
- 19 member campuses in CUNY
- Diverse student body
  - Undergraduates: > 60% African-American or Hispanic
  - Over 90 languages spoken on campus

The CCNY – Chicago PREM Vision

- Student-centric program
  - High-school to post-doctoral participants
  - Focus on the doctoral education structure of STEM



- Complete educational path exposed
  - From HS to research professional / faculty
  - Excitement from direct participation

- Provide opportunities & support achievement
  - Research at all levels of participation
  - Mentoring opportunities from UG through faculty
  - Education in the culture of the scientific enterprise

Core faculty

CCNY

- Jeff Morris, Chemical Engineering
  - PI & Recruiting Coordinator
  - Colloidal mixtures, rheology
- Mark Shattuck, Physics
  - Co-PI & Science Coordinator
  - Granular materials

University of Chicago

- Co-PI: Sidney Nagel
  - Jamming, drop impaction, …
- Liaison coordination: Dr. Justin Burton
  - Compton Lecturer

CCNY Senior faculty

- Joel Koplik, Physics
  - Mentoring coordinator
  - Molecular and continuum simulations
- Charles Watkins, Mechanical Engineering
  - Evaluation coordinator
  - Hybrid simulations for thermal processes
- Ilona Kretzschmar, Chemical Engineering
  - Curriculum coordinator
  - Micro-particle modification and assembly
- Taehun Lee, Mechanical Engineering
  - Computing coordinator
  - Heterogeneous system simulation, novel lattice-Boltzmann approaches
- Raymond Tu, Chemical Engineering
  - Outreach coordinator
  - Interfacial assembly, bio-inspired materials

Interactions with numerous Chicago MRSEC faculty:
K. Lee, H. Jaeger, A. Dinner, W. Zhang, …

Activities

- Science
  - Dynamic materials science: soft materials, mixtures, surfaces
  - Focus: numerical simulations and particulate / assembly experiments

  Linkages with Chicago MRSEC
  - Joint supervision of doctoral and post-doctoral students
  - REU participation
  - Traffic of scientists (and administrators!)
    - Seminars, Workshops
    - Extended visits (primarily PhD students and post-docs)

- Recruitment – particularly graduate students

- Curriculum development
  - Expand mat sci curriculum; provide foundations of material dynamics

- Outreach
  - High school research students (HS → CCNY)
  - Peer-teaching (CCNY → HS)

Participants (funded)

- PhD students
  - Lorraine Leon (Tu)
  - Luz Amaya (Lee)
  - Kai Gu (Koplik, Watkins)
  - Ehssan Nazockdast (Morris)
- Post-doctoral fellows
  - Dr. Kevin Connington (Shattuck)
  - Dr. Ashwin Selvarajan (Lee, Koplik)
  - Recruiting at present

- Undergraduate research fellows – six at present; two to join Chicago REU
- High school research students – four at present

Flavor of outreach

Relationships with HSMSE

1—Peer-teaching program @ HSMSE

2—REAL research lab experience

Peer-teaching Program Design:

Raymond Tu, Ilona Kretzschmar

CCNY Student benefits

- ☐ "Service-learning" opportunity
- ☐ Introduction to STEM teaching
- ☐ Reinforcement of coursework

HSMSE benefits:

- ☐HSMSE students see collegiate (CCNY) role models
- ☐Students meet faculty—opens participation in research at CCNY
- ☐Engineering introduced in "Principles of Engineering" class

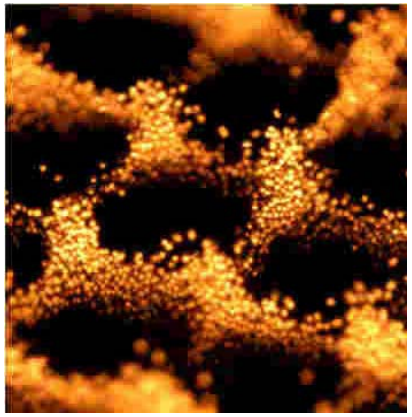
PREM & advancement of STEM: Recruiting PhD students

- A recruiting weekend
  - in New York
  - Highly-performing students
  - Targeted demographic groups

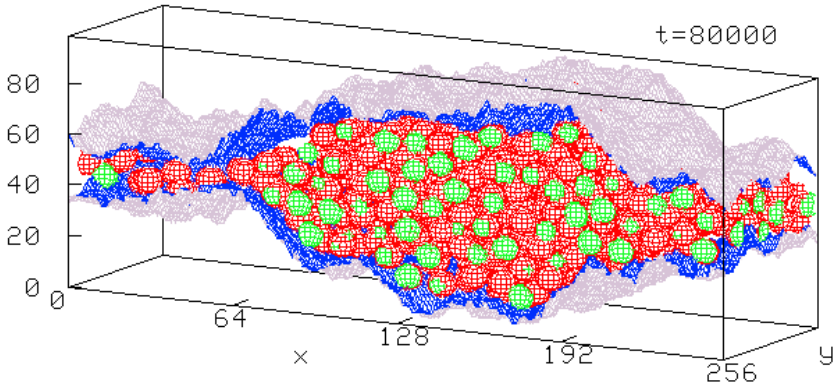
- Exposure
  - To CCNY science and engineering
    - PREM- & CREST-driven
    - Campus STEM effort
  - To the scientific enterprise
    - Why, how, where?
    - Graduate studies (GREs,stipends, choosing schools,…)
    - Career opportunities

- Goal
  - Recruitment to CCNY programs (best for us)
  - Increased fraction of students entering higher study (anywhere—next best)
  - CCNY as a leader in development of the human resource base in STEM

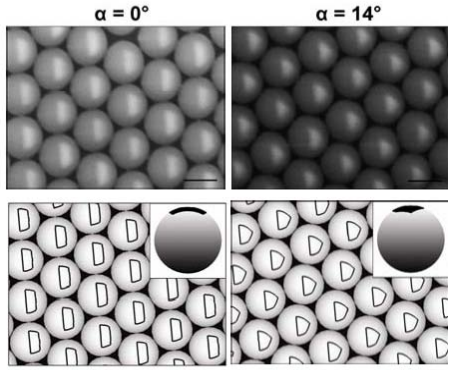
A taste of our science



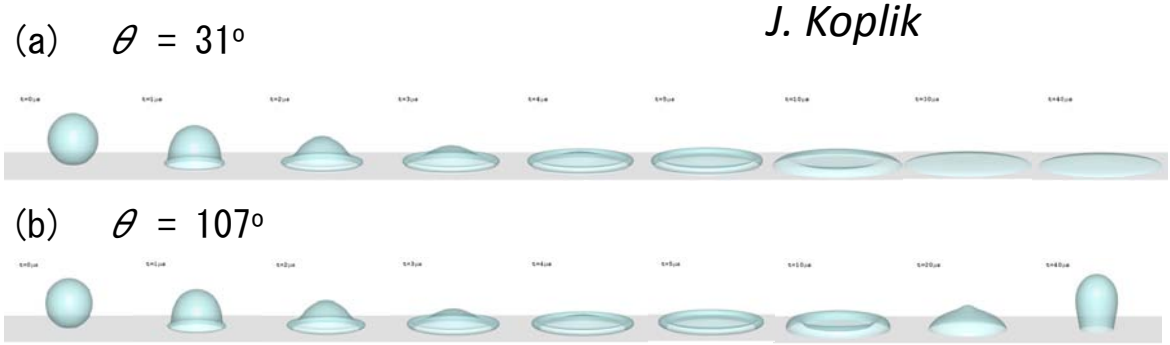
granular oscillons – M. Shattuck



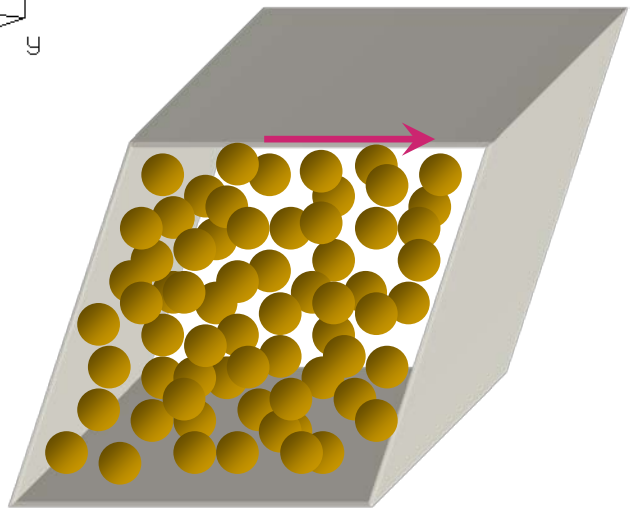
colloid flow in fractured media– J. Koplik



janus & patchy particles– I. Kretzschmar



simulation of drop impact – T. Lee



discrete particle simulation – several of us

- Thanks for your time & attention!

- Questions / comments / suggestions?