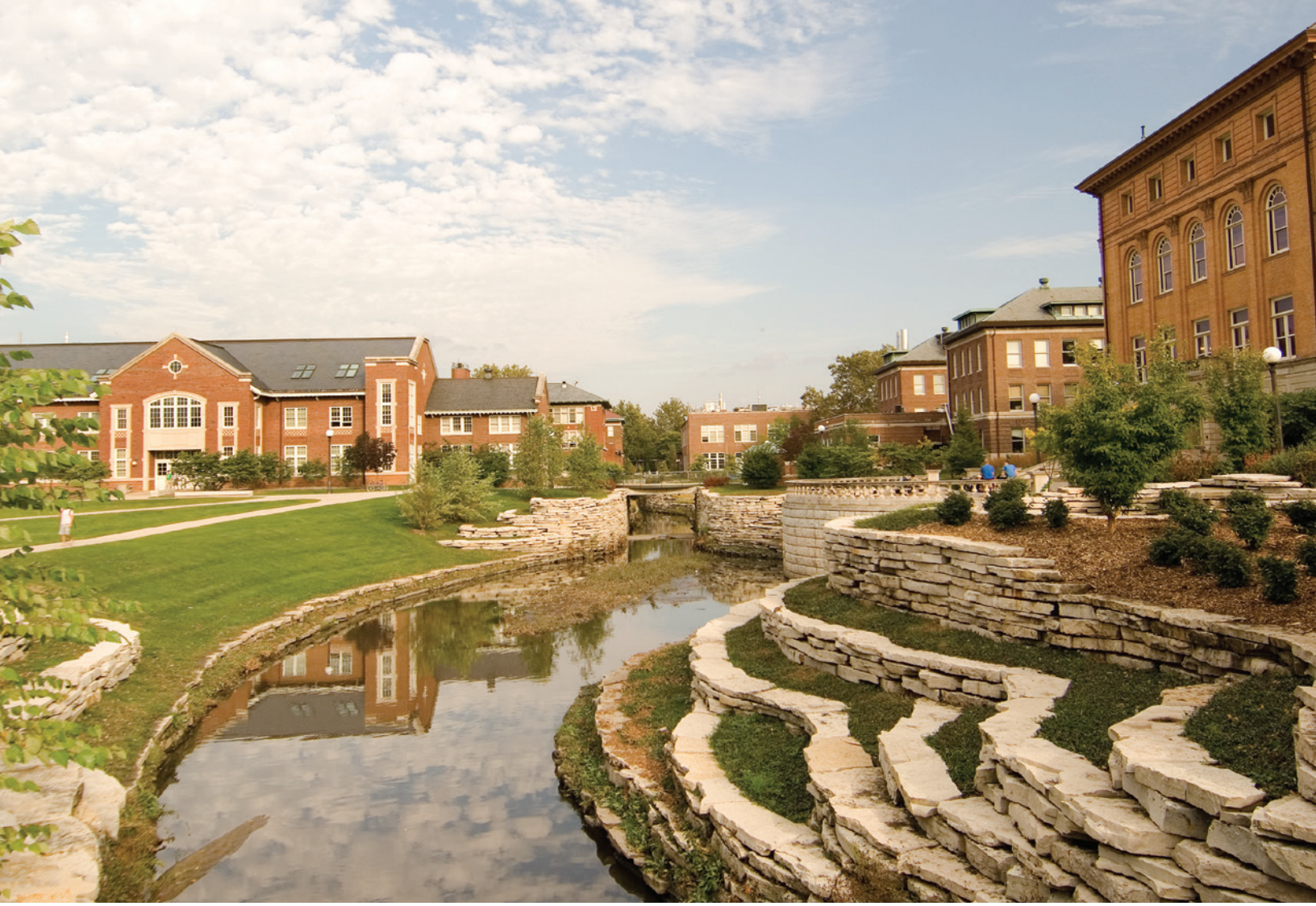

PACAM XV

FIFTEENTH PAN-AMERICAN CONGRESS OF APPLIED MECHANICS

MAY 18–21, 2015 | URBANA-CHAMPAIGN, ILLINOIS

PROGRAM OVERVIEW

	May 18 (Monday)	May 19 (Tuesday)	May 20 (Wednesday)	May 21 (Thursday)	
8:00–9:00		*Plenary Lecture* **Kaushik Bhattacharya**	*Plenary Lecture* **Nicolas Triantafyllidis**	4 Parallel Sessions	**8:20–9:35**
9:00–9:30		Coffee Break	Coffee Break	Coffee Break	**9:35–10:05**
9:30–11:35		4 Parallel Sessions	4 Parallel Sessions	3 Parallel Sessions	**10:05–11:45**
11:35–12:50		Lunch	Lunch		
12:50–1:50		*Plenary Lecture* **David Steigmann**	*Plenary Lecture* **K. Ravi-Chandar**		
2:00–4:05		4 Parallel Sessions	4 Parallel Sessions		
4:05–4:35		Coffee Break	Coffee Break		
4:35–6:40		4 Parallel Sessions	4 Parallel Sessions		
6:30	Reception (Alma Mater)				
7:30			Banquet (Illinois A)		

PLENARY LECTURES

MAY 19, TUESDAY

Room: **Illinois A** | *Chair:* **Gilles Francfort**

8:00–9:00 **Kaushik Bhattacharya,** California Institute of Technology

First Principles Study of Defects in Crystalline Materials

Room: **Illinois A** | *Chair:* **Arash Yavari**

12:50–1:50 **David Steigmann,** University of California Berkeley

Coupled-field Problems in the Mechanics and Physics of Lipid Bilayers

MAY 20, WEDNESDAY

Room: **Illinois A** | *Chair:* **Ryan Elliott**

8:00–9:00 **Nicolas Triantafyllidis,** Ecole Polytechnique and University of Michigan Ann Arbor

Stability of Active Materials: The Role of Microstructure

Room: **Illinois A** | *Chair:* **Ioannis Chasiotis**

12:50–1:50 **Krishnaswamy Ravi-Chandar,** University of Texas at Austin

Real-Time Microscopic Investigation of Deformation and Failure in Al 6061-T6

TECHNICAL PROGRAM

MAY 19, TUESDAY, 9:30–11:35

Room: **Illinois A (Plasticity I)** | *Chair:* **Dennis Kochmann**

9:30–10:20 **David McDowell** (Keynote)
Microstructure-sensitive multiscale crystal plasticity modeling

10:20–10:45 **Jaime Marian**
Linking atomistic dislocation properties with crystal plasticity: Calculation of yield surfaces in Tungsten

10:45–11:10 **Armel Mbiakop**
A homogenization model for porous crystals comprising general ellipsoidal voids

11:10–11:35 **Sriram Ganesan**
Crystal plasticity modeling and validation of deformation response in WE43 Magnesium alloy

Room: **Humanities Room (Active Materials I)**
Chair: **Luis Dorfmann**

9:30–9:55 **H. Jerry Qi**
Reshaping and recycling of thermoset polymers based on bond exchange reaction

9:55–10:20 **Fangda Cui**
Constitutive modeling of photo reprogrammed thermally activated shape memory polymers

10:20–10:45 **William Oates**
Photomechanics of glassy azobenzene polymer networks

10:45–11:10 **David Restrepo**
Cellular materials that exhibit phase transformations

11:10–11:35 **Paul Plucinsky**
Effective behavior of nematic liquid crystal elastomer membranes

Room: **Excellence Room (Homogenization I)**
Chair: **Christian Linder**

9:30–10:20 **John Kieffer** (Keynote)
Structure and mechanical properties of linear and cross-linked polymers: effects of spatial confinement

10:20–10:45 **Amira Meddeb**
Interphase effect on dielectric and mechanical properties of TiO2-PDMS composites

10:45–11:10 **Victor Lefevre**
Homogenization of coupled phenomena with oscillating source terms and application to the modeling of electrets

11:10–11:35 **Harishanker Gajendran**
A variational multiscale method for higher order mixture theory based models for interphase evolution in composites

Room: **Knowledge Room (Dynamics and Control I)**
Chair: **José Manoel Balthazar**

9:30–9:55 **Carlos Mazzilli**
Parametric instability analysis of straight risers via a rom based on non-linear Bessel-like modes

9:55–10:20 **Fernanda Correa**
Application of neuro fuzzy for strategies of power management in hybrid vehicles

10:20–10:45 **Fabio Condado Barbosa**
Analysis of non-linear dynamics and bifurcations of a shallow arch

10:45–11:10 **Victor Fallara**
Dynamic analysis of structures of clusters of tethered satellites: numerical assessment

11:10–11:35 **Arindam Bhattacharjee**
Empirical study of dimensionality in the Preisach hysteresis model

MAY 19, TUESDAY, 2:00–4:05

Room: **Illinois A (Plasticity II)** | *Chair:* **Kostas Danas**

2:00–2:50 **Amit Acharya** (Keynote)
A single theory for some quasi-static, supersonic, atomic, and tectonic scale applications of dislocations

2:50–3:15 **Abigail Hunter**
A dislocation dynamics model of the plastic flow of fcc polycrystals

3:15–3:40 **Caizhi Zhou**
Statistical grain-boundary dislocation source model for size effects of nanocrystalline metals

3:40–4:05 **Christopher Nellemann**
Strengthening and hardening phenomena associated with strain gradient crystal plasticity

Room: **Humanities Room (Fracture and Cavitation)**
Chair: **Victor Lefevre**

2:00–2:50 **Gilles Francfort** (Keynote)
An overview of the current state of the variational approach to fracture

2:50–3:15 **Xianmin Xu**
Modelling and simulations for cavitation and fracture in nonlinear elasticity

3:15–3:40 **Shelby Hutchens**
Considerations for soft material characterization via 'cavitation microrheology'

3:40–4:05 **Oscar Lopez-Pamies**
Cavitation in rubber: An elastic instability of a fracture phenomenon?

Room: **Excellence Room (Atomistics I)**
Chair: **Ryan Elliott**

2:00–2:25 **Phanish Suryanarayana**
Towards mechanics using quantum-mechanics

2:25–2:50 **Michael Falk**
Combined atomistic/continuum modeling of strain localization in metallic glass

2:50–3:15 **Dennis Kochmann**
Size effects in atomistics and coarse-grained atomistics

3:15–3:40 **Nikhil Admal**
The uniqueness of the atomistic stress tensor and its relationship to the generalized Beltrami representation

3:40–4:05 **Amit Acharya**
A study of conditions for dislocation nucleation in coarser-than-atomistic scale models

Room: **Knowledge Room (Dynamics and Control II)**
Chair: **Reyolando Brasil**

2:00–2:25 **Murilo Silva**
Optimization and dynamic nonlinear analysis of telecommunication towers submitted to the synthetic wind

2:25–2:50 **Luis Fernando Paullo Munoz**
A study of the nonlinear response of plane frame structures under seismic load in frequency domain

2:50–3:15 **José Manoel Balthazar**
On a nonlinear portal frame supported ambient vibrations energy harvester: a state of the art

3:15–3:40 **Susheel Dharmadhikari**
Towards fast-throwing robot statistics

3:40–4:05 **Sergio Ontiveros**
Simultaneous optimization of friction dampers for the seismic control in structures

MAY 19, TUESDAY, 4:35–6:40

Room: **Illinois A (Plasticity III)** | *Chair:* **Martin Idiart**

4:35–5:00 **Philipp Seiler**
Identification of creep parameters using microindentation

5:00–5:25 **Robert Waymel**
Tailored elasto-plastic wave redirection in a 2d granular array of spheres by interstitial element control

5:25–5:50 **Syeda Nusrat Sharmin**
Finite element analysis of pressurized and unpressurized high strength steel pipes to investigate the buckling response using kinematic hardening plasticity models

5:50–6:15 **Rajaprakash Ramachandramoorthy**
Bauschinger effect and intermediate strain rate plasticity in silver nanowires–experiments and atomistic modeling

6:15–6:40 **Sohan Kale**
Avalanches and percolation in elastic-plastic-brittle transitions of disordered media

Room: **Humanities Room (Active Materials II)**
Chair: **Shawn Chester**

4:35–5:00 **Kostas Danas**
On variational formulations for periodic magneto-rheological elastomers

5:00–5:25 **Charles Wojnar**
Characterizing the viscoelastic stiffness and damping of ferroelectrics during electric field cycling: experiments and modeling

5:25–5:50 **Trung Nguyen**
Optimal design of a power storage and crash resistance multifunctional material system

5:50–6:15 **Fangda Cui**
Constitutive modeling of shape memory polymers with multiple crystallizing phases

6:15–6:40 **Xiaoyu Hu**
Modeling hydrolysis degradation in polymeric materials

Room: **Excellence Room (Atomistics II)**
Chair: **Abigail Hunter**

4:35–5:00 **Yoshitaka Umeno**
Atomistic modeling of mechanical reliability of device materials

5:00–5:25 **Ryan Elliott**
A new framework for the interpretation of modulated martensites in shape memory alloys

5:25–5:50 **Sheng Yin**
Recoverable plasticity in penta-twinned metallic nanowires governed by dislocation nucleation and reaction

5:50–6:15 **Haofei Zhou**
A jogged dislocation governed strengthening mechanism in nanotwinned metals

6:15–6:40 **Kaushik Dayal**
A dynamic multiscale phase-field model: prescribable complex kinetics and nucleation with diffuse interfaces

Room: **Knowledge Room (3D printing)** | *Chair:* **H. Jerry Qi**

4:35–5:25 **Glaucio Paulino** (Keynote)
Bridging topology optimization with additive manufacturing

5:25–5:50 **Sonjoy Das**
Investigation of separation force for bottom-up stereolithography process from mechanics perspective

5:50–6:15 **Howon Lee**
Harnessing buckling of swelling hydrogels using projection micro-stereo-lithography

6:15–6:40 **H. Jerry Qi**
Active composites for 4d printing

MAY 20, WEDNESDAY, 9:30–11:35

Room: **Illinois A (Plasticity IV)** | *Chair:* **Kostas Danas**

9:30–10:20 **Vikram Deshpande** (Keynote)
Micro-mechanics of ultra-high molecular weight polyethylene fibre composites

10:20–10:45 **Nikolaos Aravas**
Non-linear homogenization methods for the constitutive modeling of multiphase materials with applications to TRIP steels

10:45–11:10 **Martin Idiart**
Estimates for the overall linear properties of pointwise heterogeneous solids with application to elasto-viscoplasticity

11:10–11:35 **Saurabh Biswas**
A compact hysteresis model with adjustable parameters that captures minor loops

Room: **Humanities Room (Active Materials III)**
Chair: **William Oates**

9:30–9:55 **Shawn Chester**
Constitutive modeling of active polymeric gels

9:55–10:20 **Yuhang Hu**
Indentation: a simple and robust method to characterize poroelasticity of gels

10:20–10:45 **Luis Dorfmann**
The time-dependent behavior of passive skeletal muscle

10:45–11:10 **Oliver Roehrle**
Chemo-electro-mechanical modelling of skeletal muscle mechanics

11:10–11:35 **Jun Zhang**
Mesoscale bounds in viscoelasticity of random composites

Room: **Excellence Room (Computational Fracture I)**
Chair: **Armando Duarte**

9:30–10:20 **Adrian Lew** (Keynote)
Simulation of brittle fracture propagation with universal meshes

10:20–10:45 **Nobphadon Suksangpanya**
Fracture analysis on the bouligand structure in stomatopod dactyl club

10:45–11:10 **Abigail Hunter**
Investigation of deformation twins using a DFT-informed 3D phase field dislocation dynamics (PFDD) model

11:10–11:35 **Piyush Gupta**
Coupled fluid-flow/mechanical/fracture simulations of non-planar hydraulic fracture propagation

Room: **Knowledge Room (Fluid Mechanics I)**
Chair: **Arif Masud**

9:30–9:55 **Robert Haber**
Spacetime discontinuous Galerkin method for hyperbolic advection–diffusion with a non-negativity constraint

9:55–10:20 **Albert Valocchi**
Pore-scale simulation of two-phase flow with applications to geological sequestration of CO2

10:20–10:45 **Caleb Brooks**

Importance of boundary condition modeling in simulating subcooled boiling using the two-fluid model

10:45–11:10 **Konstantin Volokh**

Generalized Navier-Stokes model with viscous strength

11:10–11:35 **JaeHyuk Kwack**

Non-Newtonian flows through distensible pipes: stable algorithm for fluid-structure interaction

MAY 20, WEDNESDAY, 2:00–4:05

Room: **Illinois A (Continuum Mechanics/Instabilities)**
Chair: **Amit Acharya**

2:00–2:25 **Arash Yavari**

Differential complexes in continuum mechanics

2:25–2:50 **Shankar Venkataramani**

Geometry and mechanics of non-euclidean thin sheets

2:50–3:15 **Meisam Asgari**

Elastic free-energy of wormlike micellar chains: theory and suggested experiments

3:15–3:40 **Yoav Lev**

On cavitation in rubber

3:40–4:05 **Caio César Pereira Santos**

An experimental and numerical study on axisymmetric instabilities of internally pressurized high density polyethylene pipes subjected to compressive loads

Room: **Humanities Room (Active Materials IV)**
Chair: **Yuhang Hu**

2:00–2:25 **Mazen Diab**

Hidden, forbidden and indigenous wrinkle on the surface of a soft material surface

2:25–2:50 **Shuolun Wang**

Viscoelasticity and instability in soft dielectrics

2:50–3:15 **Noy Cohen**

A comparison between different coupled models for the electro-mechanical response of EAPS

3:15–3:40 **Victor Lefevre**

The overall elastic dielectric properties of a suspension of spherical particles in rubber: an exact explicit solution in the small-deformation limit

Room: **Excellence Room (Friction and Damage I)**
Chair: **Ahmed Elbanna**

2:00–2:50 **K. Ravi-Chandar** (Keynote)

Dynamic peeling of an extensible tape

2:50–3:15 **Gregory Bouche**

Fracture mechanisms of microparticulate composites via macroscopic scratch testing

3:15–3:40 **Ahmed Elbanna**

Crack propagation in fibrillar collagen nano-composites: Role of polymeric interfaces with sacrificial bonds and hidden length

3:40–4:05 **Ashraf Idkaidek**

Modeling of soft tissue dissecting

Room: **Knowledge Room (Fluid Mechanics II)**
Chair: **Arif Masud**

2:00–2:25 **Marcelo Garcia**

Laboratory experiments on mixing processes in density currents

2:25–2:50 **Rizwan-Uddin**

Advanced coarse-mesh nodal schemes for Navier-Stokes-energy equations

2:50–3:15 **Huihe Qiu**

Pressure-driven dual core-annular flow and interfacial film instability in a capillary

3:15–3:40 **Luiz Lima**

Influence's analysis of the bubbles average diameter in the regime of the upward dispersed gas-liquid flow in vertical pipes

3:40–4:05 **Mohammad Jawed**

Elasto-visco-plastic constitutive behavior of waxy crude oils

MAY 20, WEDNESDAY, 4:35–6:40

Room: **Illinois A (Homogenization II)**
Chair: **Martin Idiart**

4:35–5:00 **Christian Linder**

The maximal advance path constraint for the homogenization of soft matter materials

5:00–5:25 **Karel Matous**

Image-based high-performance multiscale modeling

5:25–5:50 **Heng Chi**

Non-convex homogenization and stability analysis of soft heterogeneous materials via polygonal elements

5:50–6:15 **Julia Plews**

Capturing multiscale thermo-structural effects with a generalized finite element method

6:15–6:40 **Sohan Kale**

Scaling and bounds in thermoelastic properties of planar Gaussian correlated microstructures

Room: **Humanities Room (1D and 2D Materials/ Structures)** | *Chair:* **Zoubeida Ounaies**

4:35–5:25 **Ioannis Chasiotis** (Keynote)

A master curve for molecular size and strain rate dependent large deformation response of glassy PS nanofibers

5:25–5:50 **Juan Beltran**

A simple mechanical model to estimate the static response of asymmetrically damaged multilayered ropes

5:50–6:15 **Gearoid Mac Sithigh**

Torsional barreling of an elastic cylinder: the Penn-Kearsley experiment

6:15–6:40 **Gidon Weil**

Thin-wall composite spheres in finite deformation elasticity

Room: **Excellence Room (Computational Fracture II & Interphases)** | *Chair:* **Glaucio Paulino**

4:35–5:00 **Jongheon Kim**

h-adaptive generalized fem analysis of 3-d cohesive fractures: a robust and efficient strategy without mapping of non-linear solutions

5:00–5:25 **Lauren Ferguson**

Numerical simulation of mode-III fracture incorporating interfacial mechanics

5:25–5:50 **Wenjie Xia**

Localization-governed mechanical behaviors of staggered multi-layer graphene papers

5:50–6:15 **Pinlei Chen**

Finite strain formulation for interface damage with consistently evolving stabilization

6:15–6:40 **Taha Goudarzi**

Interplay of hydrodynamic and interphasial effects on the overall behavior of filled elastomers

Room: **Knowledge Room (Dynamics and Control III)**
Chair: **José Manoel Balthazar**

4:35–5:00 **Anindya Chatterjee**

Simultaneous multiple impact with distributed restitution

5:00–5:25 **Sonjoy Das**

Quadratic partial eigenvalue assignment in large-scale stochastic structural simulations

5:25–5:50 **Suzana Avila**

Semi-active pendulum to control offshore wind turbine vibrations

5:50–6:15 **Paola Gonzalez Ramos**

Modeling and control of vibrations of a long beam, deformed by a tip end pulling force

6:15–6:40 **Marcelo Sousa**

Non-linear flight control of one quadrirotor with the universal integral regulator

MAY 21, THURSDAY, 8:20–9:35

Room: **Illinois A (Computational Fracture III)**
Chair: **Lauren Ferguson**

8:20–8:45 **Reza Abedi**

Dynamic fracture and contact in rocks using an interfacial damage model

8:45–9:10 **Oliver Giraldo-Londoño**

Inverse estimation of cohesive fracture properties of asphalt mixtures using nonlinear optimization

9:10–9:35 **Pinar Acar**

Optimization of curvilinear fiber path for an infinite lamina

Room: **Humanities Room (Fluid Mechanics III)**
Chair: **JaeHyuk Kwack**

8:20–8:45 **Arezoo Ardekani**

Elastohydrodynamics of a free flexible undulatory swimmer

8:45–9:10 **Thiago Antonini Alves**

An experimental and numerical study of natural convection in laminar boundary layer on a vertical rectangular channel with discrete heating

9:10–9:35 **Lixing Zhu**

A stabilized finite element method with an interface-tracking algorithm for free-surface flows

Room: **Excellence Room (Friction and Damage II)**
Chair: **Ahmed Elbanna**

8:20–8:45 **Robert Haber**

Spacetime simulation of seismic response

8:45–9:10 **Ahmed Elbanna**

A new paradigm for modeling fault zone inelasticity: A coupled granular-bulk

framework incorporating spontaneous localization and grain fragmentation

9:10–9:35 **Robert Birch**

A comparison of soil–metal sliding resistance stress and soil–metal torsional stress in some Trinidad soils under high water content

Room: **Knowledge Room (Dynamics and Control IV)**
Chair: **Anindya Chatterjee**

8:20–8:45 **Reyolando Brasil**

Geometric and material nonlinear dynamics of trussed structures

8:45–9:10 **Rafael Rodrigues de Souza**

On the optimization of a real transmission line tower submitted to wind loads

MAY 21, THURSDAY, 10:05–11:45

Room: **Illinois A (Computational Fracture IV)**
Chair: **Julia Plews**

10:05–10:30 **G. Haikal**

Computational aspects of modeling coulomb frictional contact in the presence of large deformations

10:30–10:55 **Patrick O'Hara**

A two-scale generalized finite element method for fatigue crack propagation simulations utilizing a fixed, coarse hexahedral mesh

10:55–11:20 **Reza Abedi**

A probabilistic approach for dynamic fracture and fragmentation study of brittle materials

Room: **Humanities Room (Fluid Mechanics IV)**
Chair: **JaeHyuk Kwack**

10:05–10:30 **Martin Ostoja-Starzewski**

Continuum mechanics vis-à-vis violations of the second law of thermodynamics

10:30–10:55 **Layachi Hadji**

Stable steady solutions to the nonlinear Ostroumov problem

10:55–11:20 **Ravi Bhadauria**

Generalized Langevin Dynamics method for estimating friction at solid-liquid boundaries: Application to nano-scale transport

11:20–11:45 **Soonpil Kang**

The outflow boundary conditions for blood flow in the arterial system: application to patient specific models

Room: **Excellence Room (Materials with Microstructure)** | *Chair:* **Sohan Kale**

10:05–10:30 **Waterloo Tsutsui**

Mechanical models of electrochemical cells under impact loads

10:30–10:55 **Vinesh Nishawala**

Simulation of elastic wave propagation using cellular automata and peridynamics with comparison with experiments

10:55–11:20 **Jianke Du**

SH-saw propagation in imperfectly bonded layered magnetoelectric phononic crystal structures