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 TRANSFORM TEXAS A&M  
 ENGINEERING PROGRAM**

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### NEWS

[EEC groundbreaking ceremony slated for Friday](#)

### CALENDAR



[How to Start Your Own Company](#)

November 14, 2016 | Emerging Technologies



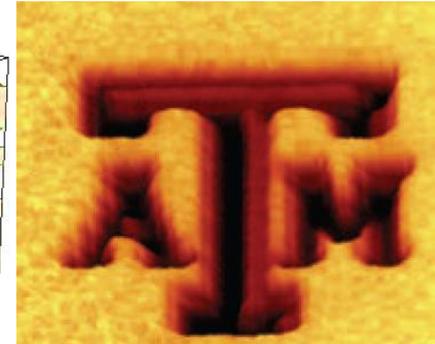
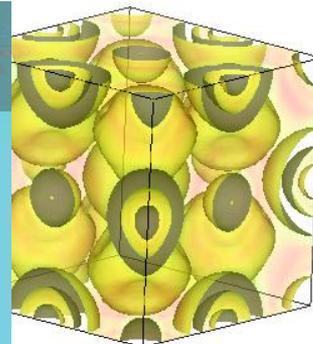
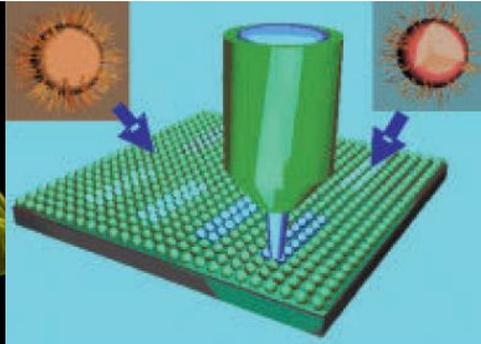
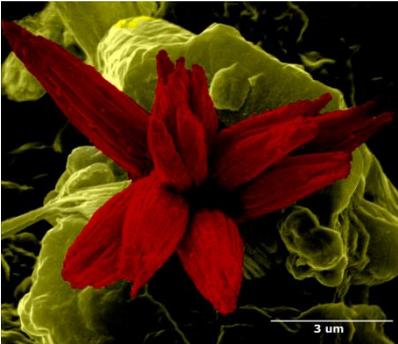
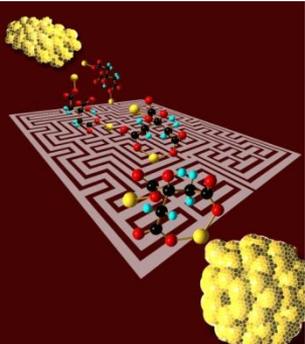


**DIVISION OF RESEARCH**  
TEXAS A & M UNIVERSITY

**Showcasing**

Distinguished  
Texas A&M researchers in  
**Material Science**

- Computational Materials Science
- Biomaterials
- Functional Materials (Electronic, Magnetic, Multifunctional, Optical)
- Nanomaterials
- Polymers and Composites
- Advanced Structural Materials





## NEWS

Texas A&M professor helps to develop new device that detects radiation better

Liang's research featured on Popular Mechanics

Arroyave part of TMS panel

Materials student co-authors article on students'

## CALENDAR



Seminar: Oxygen Nonstoichiometry In Thin Films And Nanoparticles: Measurement, Control and Implicati

November 17, 2014 | Jack E. Brown Chemical Engineering Building (CHEN)



Seminar: Adventures in Metal Oxide Nanomaterials: Phase Transitions, Electron Correlation, and Elect

## CAREER OPPORTUNITIES

Summer School on Computational Materials Science across Scales

Material development and characterization center (MDC2)





**ANNOUNCING  
 TOP SCHOLARS & NATIONAL ACADEMY MEMBERS  
 JOINING TEXAS A&M ENGINEERING**

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- CIVIL
- COMPUTER SCIENCE & ENGINEERING
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- MATERIALS SCIENCE & ENGINEERING
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- NUCLEAR
- PETROLEUM

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### CALENDAR



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November 14, 2016 | Emerging Technologies





## Christodoulos A. Floudas

Director, Texas A&M Energy Institute

Chair Professor



Office: Joining the Dept. in  
Feb. 2015

Email: [floudas@tamu.edu](mailto:floudas@tamu.edu)

### Research Interests

Our research interests are in the area of Chemical Process Systems Engineering and lie at the interface of chemical engineering, applied mathematics, operations research, computer science, and molecular biology. The principal emphasis is on addressing fundamental problems in process synthesis and design, interaction of design and control, process operations, discrete-continuous nonlinear optimization, deterministic global optimization, and computational chemistry, structural biology and bioinformatics. The unified thrust of our research relies on mathematical modelling at the microscopic, mesoscopic or macroscopic level, rigorous optimization theory and algorithms, and large-scale computations on high performance clusters of workstations.

**Process synthesis and design.** In this area, we aim at developing systematically new processes or modifying existing ones that convert the available raw materials into the desired products, and which meet the specified performance criteria of (i) minimum cost or maximum profit, (ii) energy efficiency, and (iii) good operability with respect to flexibility.

### PEOPLE

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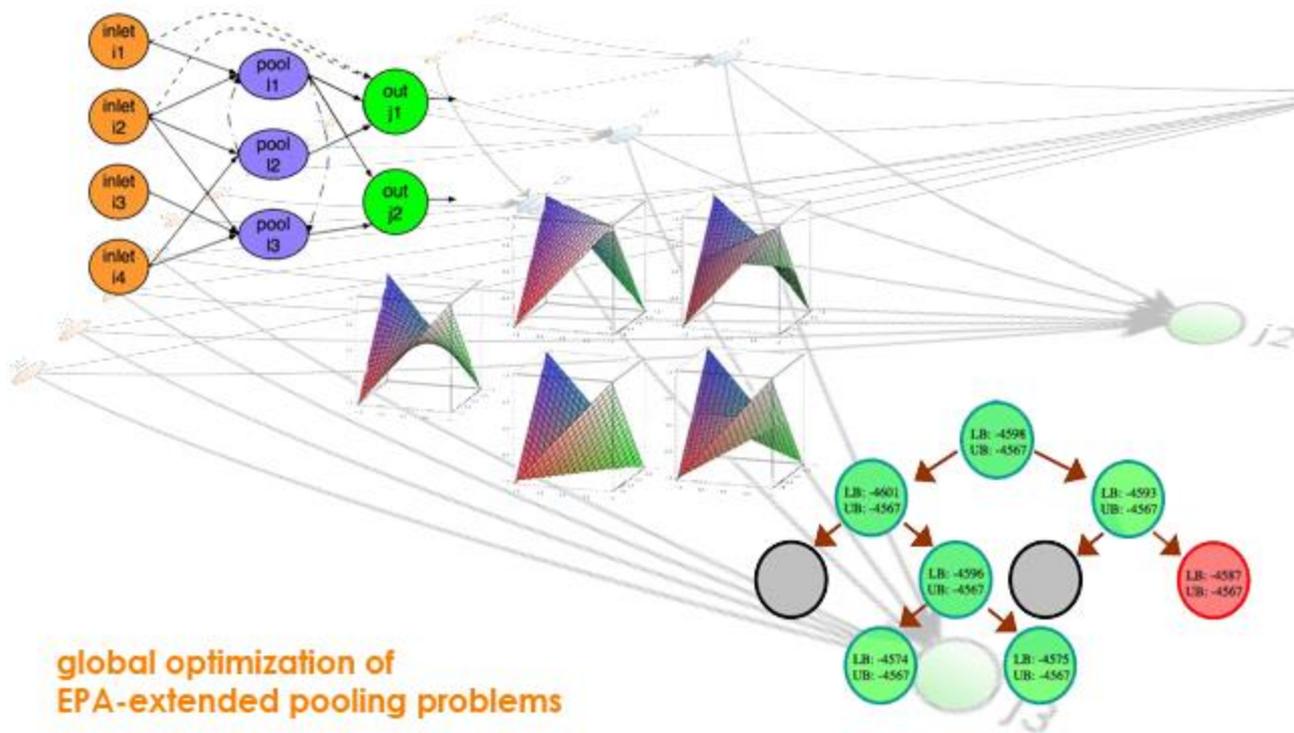
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[Retired Faculty](#)



## Main research areas:

- Product and Process Design, Synthesis and Discovery
- Product and Process Operations: Scheduling and Planning
- Discrete-Continuous Nonlinear Optimization
- Deterministic Global Optimization
- Bioinformatics and Computational Genomics





## Alan Needleman

TEES Distinguished Research Professor



Office: MEOB 503

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Email: [needle@tamu.edu](mailto:needle@tamu.edu)

### Research Interests

Professor Needleman's main research interests are in the computational modeling of deformation and fracture processes in structural materials, in particular metals. Recent and current research areas include: ductile fracture by void nucleation, growth and coalescence; multi-scale modeling of plastic deformation of crystalline solids; modeling of time and rate dependent plastic flow; crack growth in plastically deforming solids; and dynamic crack growth.

### PEOPLE

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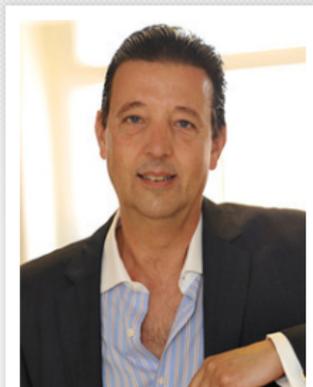
[Staff](#)





## Stratos Pistikopoulos

Chair Professor



Office: Joining the Dept. in  
Jan 2015

Email: [stratos@tamu.edu](mailto:stratos@tamu.edu)

### Research Interests

The objective of my research programme is to develop fundamental theory and optimization based methodologies and computational tools that enable process engineers to analyse, design and evaluate process manufacturing systems which are economically attractive, energy efficient and environmentally benign, while at the same time exhibit good performance characteristics like flexibility, controllability, robustness, reliability and safety. Our research involves three main strands:

**Process synthesis and the environment:** Here we are concerned with the development of process integration and pollution prevention strategies for the design and operation of plant-wide sustainable processes. Novel process synthesis modelling concepts are explored together with life-cycle and environmental impact assessment aspects, leading to new designs which feature step-change improvements in energy efficiency, waste minimization and process sustainability.

**Integration of operability objectives in process design and operation:** Our work here has centred on the development and

### PEOPLE

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## Perla Balbuena

Professor

Holder of the GPSA Professorship



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Research Website



### Research Interests

- Catalysis on metal nanoparticles for fuel cell electrocatalysts
- Catalyzed growth of single-walled carbon nanotubes
- Gas separation and storage in metal organic frameworks
- Solid-electrolyte interphase layer nucleation and growth in Si and carbon anodes of Li-ion batteries
- Materials for photocatalysis: Oxygen evolution in doped oxides
- Materials for solar cells and hydrogen production: Hydrogen evolution on coated semiconductors covered by co-catalysts
- Shale gas thermodynamics: Phase behavior of hydrocarbon + water mixtures in confined media

### Awards & Honors

NSF/POWRE award, 1997

NSF/CAREER award, 1999

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## Tahir Cagin

Professor of Materials Science & Engineering



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Personal Website



### Research Interests

- computational materials science and nanotechnology with emphasis on design
- characterization and development of multifunctional nano-structured materials for device and sensor applications
- fundamental studies on transport phenomena (heat, mass and momentum) at nanoscale and in confined media
- thermal, mechanical, electronic and magnetic properties and phase behavior of materials
- materials for thermal management, power generation and energy harvesting
- development and application of multiscale simulation methods.

### Awards & Honors

1999 Feynman Prize in Nanotechnology (Theory)

William Keeler Faculty Fellow

### Education

Ph.D. Clemson University, 1988

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## Jorge Seminario

Professor

Holder of the Lanatter & Herbert Fox Professorship



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Research Website



### Research Interests

- nanotechnology
- analysis, design and simulation of systems and materials of nanometer dimensions, especially those for the development of nanosensors and molecular electronics
- design smaller electronic devices and other systems in order to increase their efficiency, speed and energy savings, as well as reduce their costs.
- Has developed new scenarios for molecular devices and systems using molecular potentials and molecular vibrations for processing and transport of information at nanometer scales.

### Awards & Honors

Holder of the Fox Professorship

### Education

Ph.D., Southern Illinois University, 1988

M.S., Southern Illinois University, 1984

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*Jorge Seminario's  
Molecular- and Nano-  
Engineering Group*



HOME

BIO

PUBLICATIONS

TEACHING

MEMBERS

GALLERY

**Welcome to the molecular electronics  
and nano technology Group!!**



Molecular  
Electronics

We are developing new scenarios for the use of molecules and nanoclusters to mimic semiconductor electronic devices and systems, among these scenarios, molecular potentials for logic

#### **Group Recent Events**

[Karim's poster was selected as one of the best 5 \(out of more than 300\) during the Chemical](#)





## Raymundo Arroyave

Associate Professor



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Research Website



### Research Interests

- **Primary field:** Computational Materials Science
- **Methods:** computational thermodynamics and kinetics of materials; integration of atomic-scale materials simulations and phenomenological thermodynamic and kinetic models; prediction of thermo-mechanical properties of materials through atomic-scale methods; development of phase field methods to describe the time evolution of microstructures;
- **Materials:** lead-free alloys; high temperature materials (metals and ceramics); light metals; amorphous metals
- **Phenomena:** thermodynamic stability of materials; interfacial and surface effects on thermodynamics of materials; kinetics of phase transformations; thin film thermodynamics;

### Awards & Honors

2006 TMS Young Leader Internship

2002-2003 American Welding Society Graduate Research Fellowship

1996 Academic Excellence Award, ITESM, Monterrey, México

1996 Second Place Statewide. Mechanical and Electrical Engineer,

### PEOPLE

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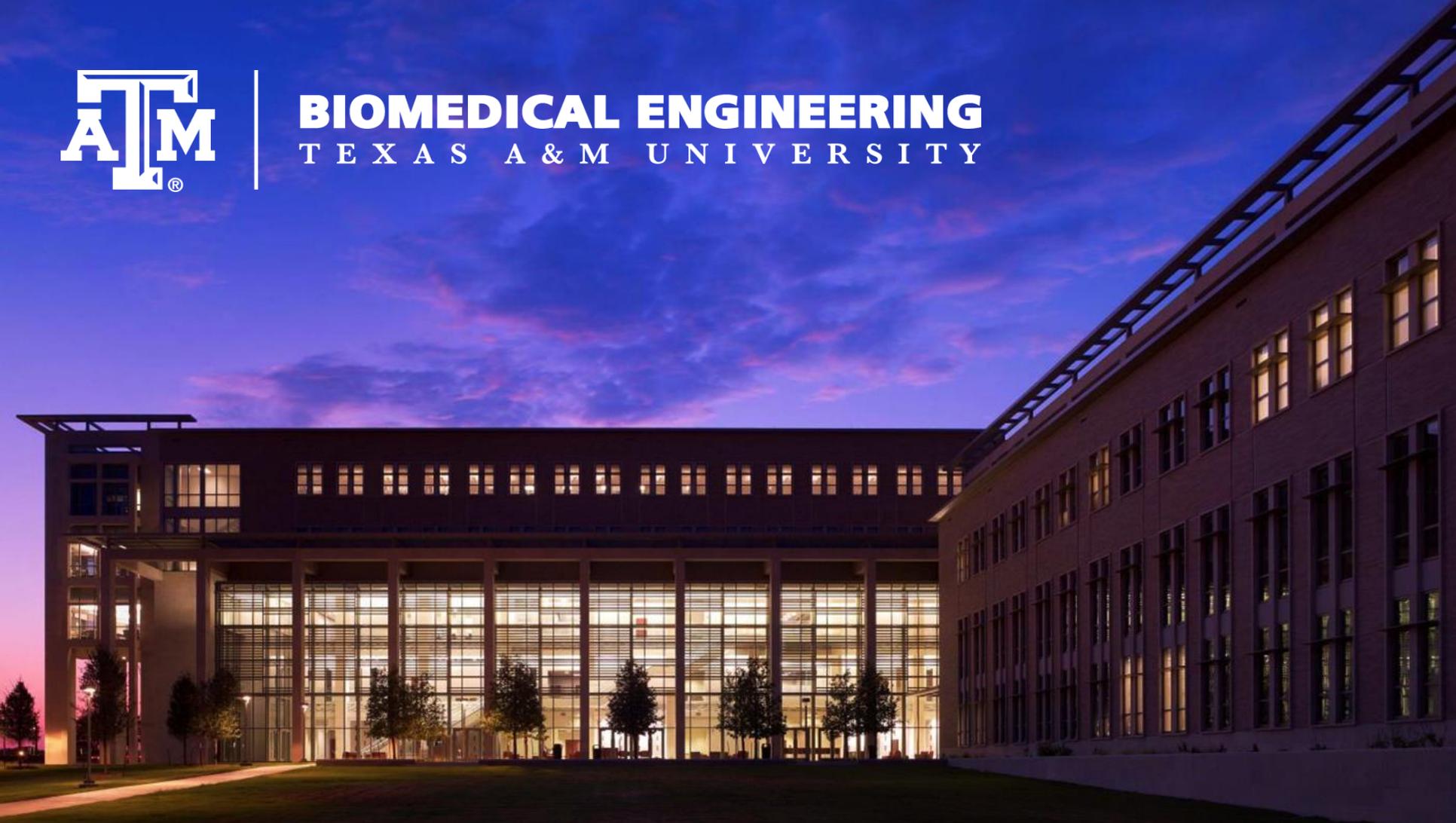
[Research Staff](#)

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**BIOMEDICAL ENGINEERING**  
TEXAS A & M UNIVERSITY



# Biomedical Engineering Research Areas

- **Vascular Biomechanics**
- **Cardiac, Vascular, and Cellular Mechanics**
- **Cell Mechanobiology**
- **Molecular Dynamics**
- **Nanosensors**
- **Optical Biosensing**
- **Tissue Microscopy**
- **Biomaterials**
- **Tissue Engineering**
- **Computational Mechanics**





## Wonmuk Hwang

Associate Professor of Biomedical Engineering



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[Research Webpage](#) 

[Curriculum Vitae](#)

### Research Interests

Dr. Wonmuk Hwang is associate professor in the Department of Biomedical Engineering at Texas A&M University. Dr. Hwang's research interests are broadly on the mechanics of biomolecules and supramolecular assemblies. Current projects include: mechanics, assembly, and degradation of collagen, operation mechanisms of motor proteins including kinesin and ClpX, and mechanical regulation of T-cell receptors. In addition, he develops computational tools for biomolecular simulations and bioimage analysis.

### Education

Postdoctoral, Biomedical Engineering, Massachusetts Institute of Technology

Ph.D., Physics, Boston University

M.S., Physics, Boston University

B.S., Physics, Seoul National University

### PEOPLE

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