

**Symposium**  
**“Advanced Materials, Structures and Mechanics – New Advances in the  
21<sup>st</sup> Century”**

**Organized by**

**Pizhong Qiao, Washington State University, [qiao@wsu.edu](mailto:qiao@wsu.edu)  
Yu Qiao, University of California – San Diego, [yqiao@ucsd.edu](mailto:yqiao@ucsd.edu)**

at

**Earth & Space 2008 Conference**  
**“Science, Engineering, Construction and Operations in Challenging  
Environments”**

March 3 – 5, 2008 in Long Beach, California, USA.

Renaissance Long Beach Hotel

Visit <http://content.asce.org/conferences/earth2008/welcome.html> for more  
information

**(Total: 15 Sessions and 82 papers)**  
**Update on Feb. 1, 2008**

The symposium on “Advanced Materials, Structures and Mechanics – New Advances in the 21<sup>st</sup> Century” will present a broad range of topics related to Advanced Materials, Structures and Mechanics, particularly their recent advances and developments. A total of about 80 papers in 15 sessions will be presented, and they include interesting topics from composites application primarily focusing on NASA Crew Module Project, to computational mechanics including new modeling and simulation tools, to mechanics of advanced materials developing new numerical, experimental and analytical techniques for new and advanced materials, to structural and dam engineering researching existing challenges in conventional fields, to advanced concrete materials research exploring high performance concrete and evaluating long term performance and durability, to structural health monitoring inventing new algorithms and testing viable techniques, finally to emerging materials and structures such as smart liquids and nanoporous materials. Significant emphases have been put forth in composite crew construction, development of structural monitoring techniques, and emerging materials. The presenters in the symposium are primarily from academia consisting of researchers from the US, Canada, China, and India, and governmental agencies, including NASA and Air Force.

**Keynote Speaker**

Michael T. Kirsch  
NESC Principal Engineer  
“NASA Engineering and Safety Center Composite Crew Module Project”

## **Composites – Applications I (Qiao 1: 6 papers)**

**Chairs: John E. Higgins and Craig Collier**

**Monday 10:30 am to 12:00 pm**

Customizing Stress Distributions within the Lower Pressure Shell of a Composite Crew Module

Mindy Jacobson

CCM LPS Analysis & Test, NASA/JPL-CalTech

Eric Schleicher, CCM LPS Analyst, ATK

Ian Fernandez, CCM LPS Designer, NASA/ARC

Jim Jeans, CCM Analysis & Test, Genesis Engineering

[Mindy.b.jacobson@jpl.nasa.gov](mailto:Mindy.b.jacobson@jpl.nasa.gov)

Structural Testing of Highly Stressed Features of the NASA Composite Crew Module

John E. Higgins

*Air Force Research Laboratory, Space Vehicles Directorate, Kirtland AFB, NM*

Paul Roberts

NASA Engineering and Safety Center, Langley VA

[drjhigg@comcast.net](mailto:drjhigg@comcast.net)

The Design, Analysis, and Test Verification of the Upper Pressure Shell Section of a Composite Crew Module

David W. Sleight and David Paddock

NASA LaRC, Hampton, VA, 23681

John Hudeck

NASA GSFC, Greenbelt, MD, 20771

[David.w.sleight@nasa.gov](mailto:David.w.sleight@nasa.gov)

Pressure Shell Splice Design, Analysis, and Test Verification (**withdraw**)

Luis Santos, NASA, Goddard Space Flight Center, Greenbelt, MD

[Luis.h.santos@nasa.gov](mailto:Luis.h.santos@nasa.gov)

Analysis Methods used on the NASA Composite Crew Module

Craig Collier, Phil Yarrington, Mark Pickenheim and Brett Bednarcyk

Collier Research Corp., Hampton, VA 23669

[craig.collier@hypersizer.com](mailto:craig.collier@hypersizer.com)

Design and Analysis of the NASA Composite Crew Module Lower Pressure Shell,

Ian Fernandez

Mechanical Systems and Materials Engineering, NASA/ARC, Moffett Field, CA 94035

James W. Jeans

*Structural Design & Analysis, Inc., Reston, VA, 20194*

[Ian.m.fernandez@nasa.gov](mailto:Ian.m.fernandez@nasa.gov)

## **Composites – Applications II (Qiao 1: 6 papers)**

**Chairs: N. Uddin and Julio F. Davalos**

**Monday 1:30 pm to 3:00 pm**

Design and Demonstration of Multifunctional Nanocomposites for Deep Space Radiation Shielding

*Bin Chen*

NASA Ames Research Center, Moffett Field, CA 94035

*Qibing Pei*

Department of Materials Science and Engineering, UC Los Angeles, CA 90095

[bchen@mail.arc.nasa.gov](mailto:bchen@mail.arc.nasa.gov)

Design, Testing and Analysis of a Deployable Composite Telescope

Daniel M. Garcia and Arup K. Maji

*Department of Civil Engineering, MSC01 1070, University of New Mexico, Albuquerque, NM 87131*

Brett J. deBlonk

*Space Vehicles Directorate, AFRL/VSSV, Air Force Research Laboratory, Kirtland AFB, NM 87117*

Jeffrey A. Whetzal

*Dept. of Chemical Engineering, South Dakota School of Mines and Technology, South Dakota School of Mines and Technology, Rapid City, SD 57701*

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Effective properties of porous media with internal pressure

Qing-Sheng Yang, Chun-Jiang Li

Dept. of Engineering Mechanics, Beijing University of Technology, Beijing 100022, [c](#)

Experimental Study on Shear Connection for FRP Bridge Decks

Julio F. Davalos and Bin Zou

Department of Civil and Environmental Engineering, West Virginia University, Morgantown, WV 26506-6103, USA

Phone: 293-3031, X2632;

[jfdavalos@mail.wvu.edu](mailto:jfdavalos@mail.wvu.edu)

Natural Fiber Reinforced Structural Insulated Panels (SIPs) for Panelized Construction

R.R. Kalyankar<sup>1</sup>, N. Uddin<sup>2</sup>, A.S.Vaidya<sup>1</sup>

<sup>1</sup>Graduate Assistant, Department of Civil Engineering, <sup>2</sup> Associate Professor, Department of Civil Engineering, University of Alabama Birmingham  
[nuddin@uab.edu](mailto:nuddin@uab.edu)

Numerical Modeling of Interface Bond between Concrete and FRP Bar

Julio F. Davalos<sup>a</sup> Yi Chen<sup>b</sup> Indrajit Ray<sup>c</sup>

<sup>a</sup> Benedum Distinguished Teaching Professor, <sup>b</sup> Graduate Research Assistant, <sup>c</sup> Research Assistant Professor, Department of Civil and Environmental Engineering, West Virginia University, Morgantown, WV 26506-6103, USA

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### **Computational Mechanics (Qiao 1: 5 papers)**

**Chairs: Jifeng Xu and Pizhong Qiao**

**Monday 3:30 pm to 5:00 pm**

Dynamic response of pile groups embedded in transversely isotropic media using hybrid numerical methods

Asadollah Noorzad and Babak Shahbodagh Khan

UT, Iran

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A new discontinuous Finite Element Method

Yu Tiantang, Li Haijie

Department of Engineering Mechanics, Hohai University, Nanjing 210098, P.R.China

[yrx06@163.com](mailto:yrx06@163.com)

Shape Optimization of Five-center Shell Structure Based on Response Surface Method

Jiazheng DU Yunkang SUI Lianchun LONG Zhiguang YANG

Dept. of Engineering Mechanics, Beijing University of Technology, Beijing 100022, China

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Self-healing SMA Composite Simulation using Variational Asymptotic Method

Dinesh Kumar Harursampath<sup>†§</sup> and Arvind Kumar Sharma<sup>‡</sup>

<sup>†</sup> Assistant Professor, Department of Aerospace Engineering, Indian Institute of Science, Bangalore, India

<sup>‡</sup> Student, Department of Aerospace Engineering, Indian Institute of Science, Bangalore, India

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Three-Dimensional Finite Element Analysis of Tapered FRP Pole

H. Mohamed<sup>1</sup> and R. Masmoudi<sup>1</sup>

1 Department of Civil Engineering, University of Sherbrooke, Sherbrooke, Quebec, Canada

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## **Mechanics of Advanced Materials I (Qiao 1: 7 papers)**

**Chairs: Pizhong Qiao and Ying Chen**

**Wednesday (Changed from Tuesday) 10:30 am to 12:00 pm**

Experimental study on fracture parameter of three-point bending beam based on smart properties of CFRC

ZHANG Dian-jun<sup>1</sup>, XU Shi-lang<sup>2</sup>

(1. Yellow River Shandong Bureau, Jinan 250011, China ;

2.State Key Laboratory of Coastal and Offshore Engineering, Dalian University of Technology, Dalian 116023, China)

[Taylor\\_power@163.com](mailto:Taylor_power@163.com)

An isotropic damage model for concrete in strain space

LI Tongchun LIU Xiaoqing

*College of Water Conservancy and Hydropower Engineering, Hohai University, Nanjing, 210098, P. R. China*

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Crack growth resistance of hybrid microfiber-reinforced cement composites

Ying Chen<sup>1</sup> and Pizhong Qiao<sup>2</sup>

<sup>1</sup>*Hohai University and Shandong University*

<sup>2</sup>*Washington State University*

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Interface stress distributions in FRP-strengthened concrete beams

Fangliang Chen<sup>1</sup>, Pizhong Qiao<sup>1,2</sup>

<sup>1</sup>*Department of Engineering Mechanics, College of Civil Engineering, Hohai University, Nanjing, Jiangsu 210098, P. R. China*

<sup>2</sup>*Department of Civil and Environmental Engineering, Washington State University, Pullman, WA 99164-2910, USA*

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Analytical and numerical investigation of Interfacial Stress in FRP-RC Hybrid structures  
Qing-Sheng Yang<sup>a)</sup>, Yun Cui<sup>b)</sup>, Lian-Hua Ma<sup>a)</sup>

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100022, China

b) College of Mechanical and Electronic Engineering, Hebei University of Science  
and Technology, Shijiazhuang 050018, China

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Vibration analysis of honeycomb FRP sandwich beams by a high order theory

Xuping Huo, Pizhong Qiao, and Wei Fan

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Mechanical Properties and Durability Performance of “Waterless Concrete

Houssam Toutanji

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and

Richard N. Grugel

*Marshall Space Flight Center, Huntsville, AL 35812*

## **Mechanics of Advanced Materials II (Qiao 1: 5 papers)**

**Chairs: Yu Qiao and Jialai Wang**

**Wednesday (Changed from Tuesday) 1:30 pm to 3:00 pm**

Three-Parameter Elastic Foundation Model of Piezoelectric Smart Beams

Jialai Wang, Shixin Zeng

Department of Civil, Construction, and Environmental Engineering, The University of  
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Designing With Failure In Mind-Multiple Responses to Harsh Environments

James Struck

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Non-Destructive Investigation & FEA Correlation on an Aircraft Sandwich Composite  
Structure

Justin L. Bail

Saint-Gobain

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Optimization of Mechanical and Dielectric Properties of Honeycomb Materials  
Lian-Hua Ma, Qin-Meng Wang  
Dept. of Engineering Mechanics, Beijing University of Technology, Beijing 100022  
[mlh@emails.bjut.edu.cn](mailto:mlh@emails.bjut.edu.cn)

Design optimization of honeycomb core configurations for effective transverse shear stiffnesses  
Wei Fan and Pizhong Qiao  
Washington State University  
[qiao@wsu.edu](mailto:qiao@wsu.edu)

**Structural Engineering and New Advances (Qiao 1: 6 papers)**  
**Chairs: Hong-nan Li and Pizhong Qiao**  
**Tuesday 3:30 pm to 5:00 pm**

Dynamic Behavior Experimental and Numerical Simulation of Concrete-filled Steel Tubular Frame  
DU Guo-feng<sup>1,2</sup> XU Li-hua<sup>1</sup> CHI Yin<sup>1</sup> XU Hao-ran<sup>1</sup>  
(1. School of Civil Engineering, Wuhan University, Wuhan, 430072, China;  
2. School of Urban Construction, Yangtze University, Jingzhou, 434023, China)  
[Gfd\\_1125@126.com](mailto:Gfd_1125@126.com)

Research on dynamic stability of steel radial gates  
Niu Zhiguo Li Tongchun  
College of Water Conservancy and Hydropower Engineering, Hohai University Nanjing 210098  
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THE KEY CONSTRUCTION TECHNOLOGES OF EMBEDDED AND LARGE SPAN TUNNEL IN SOFT flow Mucky GROUND  
Hongjian Li  
Associate professor, School of Civil Engineering, Shijiazhuang Railway Institute, Shijiazhuang 050043, China, Phone +860311/87935526, Fax +860311/87935526,  
[lhjhh73@163.com](mailto:lhjhh73@163.com)

The Property Experimental Study of a Lateral and Vertical Compound Seismic Isolation System  
Su Youpo<sup>1</sup>, Zhang Yumin<sup>1</sup>, Qiu Linbo<sup>2</sup>, Su Jingyu<sup>2</sup>

1. College of Architecture and Civil Engineering, Hebei Polytechnic University, Hebei, China, 063009
2. College of Architecture and Civil Engineering, Beijing University of technology, Beijing, China, 100021 )  
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Strain Monitoring and Construction Process Simulation of Long Span Rigid and Half Rigid Frame Box Girder Bridge

WANG Guang-yue , LIU Jian , CHEN Ying , MENG Ling-xing

School of Civil Engineering , Shandong University , Jinan 250061, China )

[chenying@sdu.edu.cn](mailto:chenying@sdu.edu.cn)

Experimental study on the uniaxial dynamic tensile damage of concrete

XIAO Shi-yun , TIAN Zi-kun

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## **Structural Health Monitoring Algorithms I (Qiao 1: 4 papers)**

**Chairs: Jialai Wang and Hong-nan Li**

**Wednesday 10:30 am to 12:00 pm**

Multiscale Modal Curvature-Based Damage Detection Using Improved Laplacian Operators

Maosen Cao, Pizhong Qiao, and Runbo Bai

Hohai University and Washington State University

[qiao@wsu.edu](mailto:qiao@wsu.edu)

Non-contact impedance-based SHM technique

Jialai Wang, Shixin Zeng

Department of Civil, Construction, and Environmental Engineering

The University of Alabama, Tuscaloosa, AL 35487.

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Ambient vibration study for Real time Monitoring of Suspension Bridge Using GPS

Ting-Hua Yi<sup>1,2,a</sup>, Hong-Nan Li<sup>1,b</sup> and Xiao-Dong Yi<sup>1,c</sup>

<sup>1</sup>State Key Laboratory of Coastal and Offshore Engineering, School of Civil and Hydraulic Engineering, Dalian University of Technology, Ganjingzi District, Linggong Road 2, Dalian, 116024, P.R.China; PH (+86) 411-84709539; FAX (+86) 411-84708501

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Condition Assessment of Existing Reinforced Concrete Bridges

by Youzhi Wang Yuanyuan Sun Tongqin He Song Liu

<sup>1</sup> Professor and Dean, School of Civil Engineering, Shandong University, Jinan, China, 250061

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## **Structural Health Monitoring Algorithms II (Qiao 1: 6 papers)**

**Chairs: Pizhong Qiao and Liu Jian**

**Wednesday 1:30 pm to 3:00 pm**

*Optimal placement of displacement-based energy dissipative devices for passive response control by genetic algorithms*

Hong-Nan Li , Ji-Ting Qu and Gang Li

(State Key Laboratory of Coastal and Offshore Engineering, Dalian University of Technology, Dalian 116023 China ;)

[dianaqjt@yahoo.com.cn](mailto:dianaqjt@yahoo.com.cn)

Research and Application of GA Neural Network Model on Dam Displacement Forecasting

Liu Jian, Wang Guanyue, Chen Ying

School of Civil Engineering, Shandong University, Jinan, 250061, P. R. China

[Lj75@sdu.edu.cn](mailto:Lj75@sdu.edu.cn)

*Secondary Safety Monitoring Indexes for Displacement of an Arch Dam Based on Structural Calculation Method*

Liu Jian<sup>1</sup>, Lian Jijian<sup>2</sup>

<sup>1</sup> School of Civil Engineering, Shandong University, Jinan, 250061, P. R. China

<sup>2</sup> School of Civil Engineering, Tianjin University, Tianjin, 300072, P. R. China

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Regeneration of missed records data at vertical axes of Karkheh earth dam using the cell pressures, mathematical aspects & SSM

Afshin Turk

[aturk@members.asce.org](mailto:aturk@members.asce.org)

Damage Detection of Laminated Composite Structures by a New Static/dynamic Technique

Wahyu Lestari and Pizhong Qiao

Washington State University

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Time Varying Analysis Model for Cracks Causality of Concrete Dams

SU Huaizhi, HU Jiang

*College of Water Conservancy and Hydropower Engineering, Hohai University, Nanjing 210098, China*

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WEN Zhiping

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## **New Development in Structural Health Monitoring (Qiao 1: 4 papers)**

**Chairs: Mark C. Bourland and Robert L. Yuan**

**Wednesday 3:30 pm to 5:00 pm**

Review on Technologies in ensuring safety of hydraulic engineering

GU Chong-shi<sup>1, 2</sup>, SU Huai-zhi<sup>1, 2</sup>

*1 College of Water Conservancy and Hydropower Engineering, Hohai University, Nanjing 210098, China;*

*2. National Engineering Research Center of Water Resources Efficient Utilization and Engineering Safety, Nanjing 210098, China*

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Application of an embedded FBG sensing system to RC structure health monitoring

Li Sun<sup>1,2</sup>, Hongnan Li<sup>2</sup>

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2. School of Civil and Hydraulic Engineering, Dalian University of Technology, 116023

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Optical Metrology and Resolution Test for a Dobsonian Newtonian Telescope

Mark A. Harris<sup>1</sup>, Arup K. Maji<sup>2</sup>, Brett J. deBlonk<sup>3</sup> and Jeffrey A. Whetzal<sup>4</sup>

<sup>1</sup> Department of Civil Engineering, MSC01 1070, Albuquerque, NM 87131

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Vibrating Wire Strain Gages and Civil Structures

Mark C. Bourland and Robert L. Yuan

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## **High Performance Concrete and Durability (Qiao 2: 6 papers)**

**Chairs: Shi Yan and Julio F. Davalos (or Indrajit Ray)**

**Monday 10:30 am to 12:00 pm**

Application of compound materials in rolled concrete dam

Shuping Huang

*College of Civil Engineering, Hohai University, Nanjing 210098, P. R. China*

[hsphhu@163.com](mailto:hsphhu@163.com)

Experimental Research on Concrete Durability under Controlled Permeability Formwork

Inner-Liner

Zheng-Hong TIAN

College of Water Conservancy and Hydropower Engineering, Hohai University, nanjing 210098, China

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Pseudo-dynamic test research on high-strength concrete frame structure reinforced with high-strength rebars

SHI YAN, XIN CHEN

School of Civil Engineering, Shenyang Jianzhu University, Shenyang Liaoning 110168, China)

Email address: [syan1962@gmail.com](mailto:syan1962@gmail.com); [michaelchenly@21cn.com](mailto:michaelchenly@21cn.com)

Seismic performances of high-strength shear walls reinforced with high-strength rebars

SHI YAN, YUEGUO ZHANG, LONGFEI ZHANG

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#### CARACTRISTEC BEHAVIOR OF PRESTRESSED FLAT SLABS

H.Mohamed, A. Moussa and Amr Abuo Hashish and Amr Salama

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Characterizations of Early Age Interface Properties of High-Performance Concrete Overlay and Normal Concrete Substrate

Indrajit Ray<sup>a</sup> Julio F. Davalos<sup>b</sup> Tao Hong<sup>c</sup>

<sup>a</sup> Research Assistant Professor

<sup>b</sup> Benedum Distinguished Teaching Professor

<sup>c</sup> Graduate Research Assistant

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### **New Modeling and Simulation Techniques/Tools I (Qiao 2: 5 papers)**

**Chairs: Jifeng Xu and Pizhong Qiao**

**Monday 1:30 pm to 3:00 pm**

An Implicit Peridynamic Method for Damage and Failure Analysis

Jifeng Xu<sup>1\*</sup>

<sup>1</sup>*Mathematics and Computing Technology, Boeing Phantom Works, Seattle, Washington 98124*

Email: [jifeng.xu@boeing.com](mailto:jifeng.xu@boeing.com)

Three-dimensional cure simulation of Large-Scale Stiffened Thermosetting Composite Panels

Guangquan Yue, Boming Zhang, Fuhong Dai, Shanyi Du

PO Box 3010, No.2 Yikuang Street, Centre for Composite Materials and

Structures, HIT Science Park, Harbin Institute of Technology, Harbin 150080, PR

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Finite Element Simulation on Progressive Collapse Resistance of Reinforced-concrete Frame Beam

Su Youpo<sup>1</sup>, Qi Jiarui<sup>1</sup>, Liu Yu<sup>2</sup>

1. College of Architecture and Civil Engineering, Hebei Polytechnic University, Hebei, China, 063009

2. Department of Civil Engineering, Hebei Enerty Institute of Vocation and Technology, Hebei, China, 063000

[suyoupo@165e.com](mailto:suyoupo@165e.com)

[Added] STRESS-STRAIN CONSTITUTIVE MODEL OF GEOLOGICAL AND SYNTHETIC MATERIALS CONSIDERING ELASTO-PLASTIC COUPLING

ZHU Sheng

College of Water Conservancy and Hydropower Engineering, Hohai Univ., Nanjing 210098, China

[szhu@hhu.edu.cn](mailto:szhu@hhu.edu.cn)

[Added] Application of Three Dimensional Elasto-viscoplastic Composite Element Method on Jointed Dam Base

Qiang Sheng<sup>1,2</sup>, Zhang Yang<sup>1</sup>, Chen sheng-hong<sup>2</sup>

(1. Hohai University, Nanjing, Jiangsu, 210098, P. R. China)

(2. Wuhan University, Wuhan, Hubei, 430072, P. R. China)

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## **New Modeling and Simulation Techniques/Tools II (Qiao 2: 6 papers)**

**Chairs: Chengbin Du and Li Tongchun**

**Monday 3:30 pm to 5:00 pm**

Numerical Simulation of Three-dimensional Concrete with Arbitrary Shape Aggregate and Its Application

Chengbin Du\* and Liguo Sun<sup>†</sup>

\*Department of Engineering Mechanics, Hohai University, Nanjing 210098, China

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3D numerical analysis of embedded tunneling on adjacent existing deep excavation

Hongjian Li

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[Lhjhh73@163.com](mailto:Lhjhh73@163.com)

An efficient finite element dynamic substructure approach using the local mesh refinement technique

Zhao Lanhao , Li Tongchun

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Local Refinement Method for Shear Failure Problems of Soil Foundation

Liu Xiaoqing , Li Tongchun

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Optimization of Strengthening Scheme for Buildings Based on Multi-Objective and Half-Structural Fuzzy Theory

WANG Guang-yue , CHEN-Ying , ZHAO Ming

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Tracing crack propagation of concrete acted by transient temperature field

SUN Yuelin,

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SHEN Zhenzhong,

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## **Emerging Materials and Structures I (Qiao 2: 5 papers)**

**Chairs: A. Alice Han and Yu Qiao**

**~~Wednesday (change from Tuesday) 10:30 am to 12:00 pm~~**

**Tuesday 10:30 am to 12:00 pm (Changed back to Tuesday)**

Size Effect in Cleavage Cracking in Polycrystalline Thin Films

Weiyi Lu, Jin Chen, Yu Qiao

*Department of Structural Engineering, University of California at San Diego, La Jolla, CA 92093-0085, USA*

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DEVELOPING WATER-FREE, HIGH-PERFORMANCE INFRASTRUCTURAL MATERIALS USING LUNAR SOILS

Yu Qiao, Venkata K. Punyamurtula

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## DEVELOPING ADVANCED THERMOELECTRIC AND MECHANOELECTRIC SYSTEMS USING NANOPOROUS MATERIALS

HYUCK LIM, A. ALICE HAN, YU QIAO

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## Developing Smart Liquids

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## Development of Liquid Damper

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## Emerging Materials and Structures II (Qiao 2: 6 papers)

Chairs: Hong-nan Li and Yu Qiao

~~Wednesday (changed from Tuesday) 1:30 pm to 3:00 pm~~

**Tuesday 1:30 pm to 3:00 pm (Changed back to Tuesday)**

## Cement-matrix magnetostrictive smart composites

Jialai Wang, Shixin, Zeng

Department of Civil, Construction, and Environmental Engineering

The University of Alabama, Tuscaloosa, AL35487, USA

[jwang@eng.ua.edu](mailto:jwang@eng.ua.edu)

## *Simplified Method for Pushover Curves of Asymmetric Structure with Displacement-Dependent Passive Energy Dissipation Devices*

Li Gang , Li Hong-nan

State Key Laboratory of Costal and Offshore Engineering, Dalian University of Technology, Dalian 116023 China

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Shake table tests of semi-active fuzzy control for seismic response reduction with piezoelectric friction damper

Da-Hai Zhao, Hong-Nan Li

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The Development of a New-type Composite MR Damper and Magnetic Circuit Simulation Analysis

Chengbin Du<sup>\*</sup>, Guojun Yu<sup>†</sup>

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Thermal Protection System for Reusable Launch Vehicles

Patrick Pace and Arup Maji

University of New Mexico, MSC 01 1070, Albuquerque, NM 87131

[amaji@unm.edu](mailto:amaji@unm.edu)

LIGHTWEIGHT AEROGEL BEAD INSULATION

Roxana M. Trifu, Gregory J. Caggiano and George L. Gould

Aspen Aerogels Incorporated, 30 Forbes Rd., MA 01532

[rtrifu@aerogel.com](mailto:rtrifu@aerogel.com)

## **Dam Engineering (Qiao 2: 7 papers)**

**Chairs: Dongjian Zheng and Pizhong Qiao**

**Wednesday 10:30 am to 12:00 pm**

A DECISION SUPPORT SYSTEM FOR MONITORING DAM BEHAVIOR

SU Huai-zhi<sup>1,2</sup>, Hu Jiang<sup>1</sup>, WU Zhongru<sup>1</sup>, GU Chong-shi<sup>1, 2</sup>

(1. *College of Water Conservancy and Hydropower Engineering, Hohai University, Nanjing 210098, China;*

2. *National Engineering Research Center of Water Resources Efficient Utilization and Engineering Safety, Nanjing 210098, China)*

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A MODEL FOR QUANTITATIVE ANALYSIS OF STRESSES OF THE THREE GORGES DAM IN CONSTRUCTION

Tengfei Bao\*, Zhongru Wu, Chongsi Gu

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A model for dam health monitoring

Tengfei Bao, Zhongru Wu, Chongsi Gu, Dongjian Zheng

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AN INVESTIGATION ON THE DAMAGE TO UNDERGROUND WATER PIPELINES DUE TO EARTHQUAKE

Jing-hai Zhou<sup>1</sup>; Li Sun<sup>1,2</sup>; Hong-nan Li<sup>2</sup>

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2.School of Civil and Hydraulic Engineering, Dalian University of Technology, Dalian, China, 116023

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Early warning index of deformation for gravity dam based on discontinuous deformation analysis

MA Ming<sup>1,2</sup> SHEN Zhenzhong<sup>1</sup> TU Xiaoxia<sup>1,3</sup>

1.College of Water Conservancy and Hydropower Engineering, Hohai University, Nanjing, China, 210098; 2. Gansu Hydroelectric Investigation Design and Research Institute, Lanzhou, China, 730030; 3. Hydraulic Engineering Section, China Pearl River

Water Resources Planning, Design and Survey co., Ltd., Guangzhou, China, 510610 )

[zhzhshen@hhu.edu.cn](mailto:zhzhshen@hhu.edu.cn)

Natural frequency-based analysis of crack effect on stiffness of concrete arch dam  
ZHENG dongjian LIANG yueying

College Of Water Conservancy and Hydropower Engineering, Hohai University ,

Nanjing 210098, P.R. China

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[Added] The Development of the Low-cost & High-precision Displacement Measuring System and Application in the study of Double-curved Arch Dam Model Test

Ruan Shan-fa, Zhou Cheng

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