

# SURENDRA P. SHAH

## BIOGRAPHICAL DATA

Center for Advanced Cement-Based Materials  
Northwestern University  
Technological Institute  
2145 Sheridan Road, Suite A130  
Evanston, Illinois 60208  
(847) 491-3858 - Phone  
(847) 467-1078 - Fax  
s-shah@northwestern.edu - E-mail

**Education**      B.E. from B.V.M. College, India  
                         M.S. from Lehigh University  
                         Ph.D. from Cornell University

## Academic Experience

Present Position:    Walter P. Murphy Professor of Civil Engineering (emeritus in service), Robert R.  
                                 McCormick

School of Engineering and Applied Science Northwestern University

Prior Positions:     Professor of Civil Engineering and Materials Engineering, University of Illinois at  
                                 Chicago

Visiting Associate Professor, Department of Civil Engineering, Massachusetts Institute  
of Technology

## Administrative Experience

Prior Position:      Director, Center for Advanced Cement-Based Materials

Coordinator, Graduate Program Structural Engineering, Department of Civil and Environmental Engineering, Northwestern University

Director, Center for Concrete and Geomaterials, Northwestern University

Director, Graduate Program, Department of Materials Engineering, University of Illinois, Chicago

### **Industrial Experience**

Present: Short-term consultant for several industrial companies in U.S. and abroad

Long-Term Positions: Research Consultant, Lafarge, France  
Research Consultant, U. S. G., Des Plaines, Illinois  
Research Consultant, Wiss, Janney, and Elstner, Northbrook, Illinois  
Research Consultant, Holderbank Management, Ltd., Switzerland  
Research Consultant, Corning Glass Works, Corning, New York  
Research Engineer, Portland Cement Association, Skokie, Illinois  
Design Engineer, Modjeski and Masters, Harrisburg, Pennsylvania

### **HONORS AND OTHER PROFESSIONAL ACTIVITIES**

Member, National Academy of Engineering

Foreign Member, Chinese Academy of Engineering

Fellow, Indian Academy of Engineering

NAE Liaison Committee

NAS Panel to evaluate NIST Building and Fire Research (2009-2010)

Honorary Member, American Concrete Institute

Honorary Member, The International Union of Laboratories and Experts in Construction Materials, Systems and Structures (RILEM, from the name in French)

Elizabeth D. Rockwell Engineering Lecture, University of Houston

Distinguished Lecture Series, University of California, Los Angeles, May 2009

Honorary Professor, University of L'Aquila

Fulbright Award, Indian Institute of Technology, Mumbai, India

Della Roy Lecture, American Ceramic Society, Detroit, September 2007

Frank E. Richart Distinguished Lecture, University of Michigan, 2007

Named to the "Top Ten Most Influential Persons in the Concrete Industry," by Concrete Construction, 2006 Modeling, Measuring, and Monitoring Concrete Properties, Conference Organized in Honor of Surendra P. Shah, Greece

Robert E. Philleo Award, American Concrete Institute, Concrete Research Council, 2006

Conference Dedication and Special Award, 6<sup>th</sup> RILEM Symposium on Fiber-Reinforced Concretes (FRC) – BEFIB 2004, Varenna, Italy

Honorary Professor, Department of Civil and Structural Engineering, Hong Kong Polytechnic University

Honorary Symposium, Celebrating Concrete: People and Practice, Conference Dedication and CTU Award, University of Dundee, Scotland

American Concrete Institute, Honorary Symposium- Concrete: Material Science to Application

A Tribute to Surendra P. Shah

The Richard J. Carroll Memorial Lectureship, Johns Hopkins University

American Concrete Institute, Illinois Chapter, Henry Crown Award, 2000

American Concrete Institute, Arthur R. Anderson Award to ACBM Center, 1999

Charles Pankow Award for Innovation (Collaborative Work with W.R. Grace and ARCO), American Society of Civil Engineers, Civil Engineering Research Foundation, 1997

Engineering-News Record (ENR) Newsmaker Award, 1996

Swedish Concrete Award, 1993

Walter P. Murphy Professor of Civil Engineering

Arthur R. Anderson Award, American Concrete Institute, 1989

Sanford E. Thompson Award, American Society of Testing and Materials (ASTM), 1983

RILEM Gold Medal Award, 1980

Teaching Excellence Award, CE students

Distinguished Visiting Professor, National University of Singapore

Alexander von Humboldt Fellowship Award for Distinguished Senior Scientist

NATO Visiting Senior Scientist to Turkey

Guest Professor, Denmark Technical University

Guest Professor, Delft University of Technology, Delft, The Netherlands

Consultant to NATO Science for Stability Program

Visiting Professor, University of Sydney

NATO Visiting Senior Scientist to France

Member of the Evaluation Team of Danish Research Groups in the field of Concrete

UNIDO Consultant to People's Republic of China

UNESCO Expert to India

Member, Editorial Board, ASCE Journal of Civil Engineering Materials

Member, Editorial Board, Journal of Ferrocement

Member, Editorial Board, RILEM Journal of Materials and Structures

Editor-in-Chief, Concrete Science and Engineering

### **TECHNICAL COMMITTEES**

Transportation Research Board, Task Force on Nanotechnology

NAE Liaison Committee

NAS Panel to evaluate NIST Building and Fire Research (2009-2010)

ACI- 215 Fatigue of Concrete

ACI- 236 Material Science of Concrete

ACI- 237 Self-Consolidating Concrete

ACI- 231 Properties of Concrete at Early Ages

ACI- 440 Fiber Reinforced Polymer Reinforcement

ACI- 544 Fiber Reinforced Concrete

ACI- 548 Polymers in Concrete

ACI- 549 Thin Reinforced Cementitious Products and Ferrocement

Member, Transportation Research Board Task Force on Nanotechnology

Member, Bureau, RILEM (2002)

Chair, Advisory Committee, Engineering Mechanics Division, ASCE (1999-2001)

Chairman, Executive Committee, Engineering Mechanics Division, American Society of Civil Engineers  
(1996-1997)

Chairman, Properties of Concrete, Transportation Research Board (1993-96)

Member, National Initiative on High-Performance Concrete (past)

Member, Materials Research Council, American Concrete Institute (past)

Member, Management Advisory Board, RILEM

Member, Advisory Committee on Cement and Concrete, Strategic Transportation Research Study (1985-1986)

Chairman, RILEM Committee on Strain-Softening of Concrete

Chairman, RILEM Committee on Fracture of Concrete (1986-1992)

Chairman, Fiber Reinforced Concrete, American Concrete Institute (past)

Vice Chairman, Fracture of Concrete and Rock, Society of Experimental Mechanics

Member, High Strength Concrete, American Concrete Institute

Member, Ferrocement, American Concrete Institute

Member, Fracture Mechanics, American Concrete Institute

Member, Polymer Concrete, American Concrete Institute

Chairman, Fatigue of Concrete Structures, American Concrete Institute (past)

President, Chicago Chapter, American Concrete Institute (1974-75)

Chairman, Properties of Materials, Engineering Mechanics Division, American Society of Civil Engineers (1973-75, 1985-87)

Member, Ad Hoc Committee on Ferrocement for Developing Countries, National Academy of Sciences (1971-1972)

## **CONFERENCES**

Co-Chair, NICOM-6, Nanotechnology in Construction, Hong Kong, 2018

Co-Chair, SCC 2016, 6<sup>th</sup> North American Conference and 8th International RILEM Symposium, May 2016, Washington, D.C.

Co-Chair, NICOM-5, Nanotechnology in Construction, May 2015, Chicago.

Co-Chair, SCC 2013, Fifth North American Conference on the Design and Use of Self-Consolidating Concrete, Westin Michigan Avenue, Chicago, IL, USA, May 12–15, 2013

Chair of Scientific Team, First International Conference in North America on Nanotechnology in Cement and Concrete, Beckman Center, Irvine, CA, May 5-7, 2010

Co-Chair, US-India Workshop for Concrete in Extreme Events, Mumbai, December 2009,

Chair, SCC 2008, Third North American Conference on the Design and Use of Self-Consolidating Concrete, Chicago, November, 2008

Co-Chairman of Organizing Committee, Lahore, Pakistan 2007

Member, Advisory Board, Conference on Damage in Composite Materials; Non Destructive Testing and Simulation

Member, International Scientific Committee, FRAMCOS 6<sup>th</sup> International Conference

Member, Scientific Committee, 10<sup>th</sup> Int. Inorganic-Bonded Fiber Composites Conference, Sao Paulo, Brazil, Nov. 2006

Chair, SCC 2005, Combining the Second North American Conference on the Design and Use of Self-Consolidating Concrete and the Fourth International RILEM Symposium on Self-Compacting Concrete, Chicago, November, 2005

Co-Chairman, International Conference on Advances in Concrete Composites and Structures, Chennai, India, January 2005

Co-Chairman, International Conference, Advances in Concrete Structures and Materials, Xizou, China, May 2004

Co-Chair, First North American Conference on the Design and Use of Self-Consolidating Concrete, Chicago, November 2002

Co-Chairman, ACI-RILEM Symposium in Non-Destructive Evaluation, Dallas, October 2001

Chair, Symposium on High Performance Fiber Reinforced Thin Products, ACI, Chicago, March 1999

Co-Chairman, Symposium on Materials Science of Concrete, ACI, Chicago, March 1999

Co-Chairman, Engineering Foundation Conference, Canada July, 1998

Co-Chairman, Materials for Infrastructure, Institute of Mechanics and Materials, UCSCD, April 1998

Co-Chairman, Symposium on Nondestructive Characterization of Materials in Aging Systems, Materials Research Society, Boston, December 1997

Co-Chairman, Symposium on Advanced Cement-Based Materials, McNU '97, Evanston, IL June 1997

Co-Chairman, Symposium HH: Structure-Property Relationships in Hardened Cement Paste and Composites, Materials Research Society, 1996 Fall Meeting, Boston, December 1996

Co-Chairman, Synthesizing Cement-Based Materials for the 21st Century, American Chemical Society, National Meeting, Chicago, 1995

Co-Chairman, International Conference Workshop on Technology Transfer of the New Trends in Concrete, Barcelona, Spain, November 1994

Co-Chairman, SEM Conference on Nondestructive Testing of Concrete in the Infrastructure, Dearborn, Michigan, June 1993

Co-Chairman, ACI Symposium on Materials Science in Concrete, Boston, March 1991

Co-Chairman, ACI Symposium on Fiber Reinforced Concrete, Dallas, November 1991

Co-Chairman, International Conference on Micromechanics of Failure of Quasi-Brittle Materials, Albuquerque, June 6-8, 1990

Chairman, NATO-ARW on Toughening Mechanism of Quasi-Brittle Materials, Northwestern University, July 1990

Co-Chairman, International Conference on Fracture of Concrete and Rock, Cardiff, September 1989

Co-Chairman, Symposium on Bond in Cement Based Composites, Materials Research Society, Boston, December 1987

Co-Chairman, International Conference on Fracture of Concrete and Rock, Society of Experimental Mechanics, Houston, June 1987

Co-Chairman, Symposium on Strain Rate Effects in Cement-Based Composites, Materials Research Society, Boston, December 1985

Member, Organizing Committee, RILEM Symposium on Fracture of Concrete, Laussane, October 1985.

Co-Chairman, NSF-STU Seminar on Steel Fiber Reinforced Concrete, Stockholm, June 1985

Co-Chairman, International Symposium on Ferrocement, Bangkok, January 1985

Chairman, NATO Advanced Research Workshop on Nonlinear Fracture Mechanics, Northwestern University, Evanston, September 1984

Member, Scientific Committee, RILEM-CEB Conference on Multiaxial Loading, Toulouse, April 1984

Chairman, ACI-RILEM Symposium on Fatigue, Detroit, September 1982

Member, Advisory Panel and Chairman of the Session, International Conference on Bond in Concrete, Scotland, June 1982

Co-Chairman, RILEM Symposium on Ferrocement, Bergamo, Italy, July 1981

Chairman, Symposium on Recent Research on Fatigue of Concrete Structures, ACI, Puerto Rico, Sept. 1980; Dallas, February 1981

Chairman, National Science Foundation Sponsored Workshop on High Strength Concrete, 1979

Member, Steering Committee, Gordon Conference on Building Materials, 1973

Chairman, Conference on New Materials in Concrete Construction, University of Illinois at Chicago Circle, Chicago 1971

## **PUBLICATIONS**

### **Refereed Articles**

2018

- “FTIR study on early age hydration of carbon nanotubes modifies cement-based materials,” *Advances in Cement Research*, 2018 (with T. Shi, Y. Gao, D.J. Corr)
- “Effect of interfacial transition zone on the Young's modulus of carbon nanofiber reinforced cement concrete,” *Cement and Concrete Research*, Vol 107, pp. 49-63, 2018 (with X. Zhu, Y. Gao, Z. Dai, D.J. Corr)
- “Effect of carbon nanofiber on autogenous shrinkage and shrinkage cracking of cementitious nanocomposites,” *ACI materials*, 2018 (with Y. Gao, M.S. Konsta-Gdoutos, D.J. Corr) (in press)

2017

- “Experimental and numerical studies on impact behavior of recycled aggregate concrete-filled steel tube after exposure to elevated temperature,” *Materials and Design*, Vol. 136, pp103-118, 2017 (with W. Li, Z. Luo, C. Wu)
- “Design of SiO<sub>2</sub>/PMHS hybrid nanocomposite for surface treatment of cement-based materials,” *Cement and Concrete Research*, Vol. 87, 2017 (With R. Li, P. Hou, N. Xie)
- “Whether do nano-particles act as nucleation sites for C S H gel growth during cement hydration?” *Cement and Concrete Composites*, Vol. 87, 2017 (with D. Kong, S. Huang, D.J. Corr)
- “Mechanical behavior of recycled aggregate concrete-filled steel tube stub columns after exposure to elevated temperatures,” *Construction and Building Materials*, Vol. 146, pp. 571-581, 2017 (with W. Li, Z. Luo, Z. Tao)
- “Effect of CNT and CNF loading and count on the corrosion resistance, conductivity and mechanical properties of nanomodified OPC mortars,” *Construction and Building Materials*, Vol. 147, pp. 48-57, 2017 (with M.S. Konsta-Gdoutos, G. Batis, P. Danoglidis)
- “Effects of the hydration reactivity of ultrafine magnesium oxide on cement-based materials,” *Magazine of Concrete Research*, Vol. 69, No. 22, pp. 1-11, 2017 (with P. Hou, Y. Cai, X. Cheng)
- “Effects of graphene oxide on early-age hydration and electrical resistivity of Portland cement paste,” *Construction and Building Materials*, Vol. 136, pp. 506-514, 2017 (with W. Li, X. Li, S.J. Chen)
- “Influence of Relative Mechanical Strengths between New and Old Cement Mortars on the Crack Propagation of Recycled Aggregate Concrete,” *Journal of Advanced Concrete Technology*, Vol. 15, No. 3, pp.110-125, 2017 (with W. Li, Z. Sun, Z. Luo)
- “Viscosity prediction of fresh cement asphalt emulsion pastes,” *Materials and Structures*, Vol 50, No. 1, 2017 (with J. Ouyang, Y. Tan, D. J. Corr)



- “Effects of nanoparticle on the dynamic behaviors of recycled aggregate concrete under impact loading,” *Materials and Design*, Vol. 112, pp. 58-66, 2016 (with W. Li, Z. Luo, C. Long)
- “Early-age shrinkage development of ultra-high-performance concrete under heat curing treatment,” *Construction and Building Materials*, Vol 131, 2016 (with W. Li, H. Zhengyu, G. Hu)
- “The role and interaction of superplasticizer and emulsifier in fresh cement asphalt emulsion paste through rheology study,” *Construction and Building Materials*, Vol. 125, pp. 643-653, 2016 (with J. Ouyang, B. Han, Y. Cao)
- “Factors influencing the structure build-up of fresh cement asphalt emulsion paste,” *Road Materials and Pavement Design*, Vol. 19, No. 1, 2016 (with J. Ouyang)
- “Advanced cement based nanocomposites reinforced with MWCNTs and CNFs”, *Frontiers of Structural and Civil Engineering*, Vol. 10, No. 2, 2016 (with E.E., Gdoutos, M.S., Konsta-Gdoutos, P.A., Danoglidis)
- “Factors influencing the rheology of fresh cement asphalt emulsion paste”, *Journal of Materials in Civil Engineering*, Vol. 28, No. 11, 2016 (with J., Ouyang, D.J., Corr)
- “Investigation on the mixing stability of asphalt emulsion with cement through viscosity”, *Journal of Materials in Civil Engineering*, Vol. 28, No. 12, 2016 (with J., Ouyang, Y., Tan, D.J., Corr)
- “Strength, energy absorption capability and self-sensing properties of multifunctional carbon nanotube reinforced mortars”, *Construction Building Materials*, Vol 120, pp. 265-274, 2016 (with P.A., Danoglidis, M.S., Konsta-Gdoutos, E.E., Gdoutos)
- “Dimensional factors in oxidation induced fracture in reinforced concrete,” *Construction and Building Materials*, Vol. 122, pp. 264-272, 2016 (with M. Zulli, M. Ghandehari, A. Sidelev)
- “In-situ Ca(OH)<sub>2</sub> consumption of TEOS on the surface of hardened cement-based materials and its improving effects on the Ca-leaching and sulfate-attack resistivity”, *Construction and Building Materials*. Volume 113, pp 890-896, 2016. (with P., Hou, R., Zhang, Y., Cai, X., Cheng)
- “The thixotropic behavior of fresh cement asphalt emulsion paste”, *Construction and Building Materials*. Volume 114, pp 906-912, 2016. (with J., Ouyang, Y., Tan, D.J., Corr)
- “The use of tetraethyl orthosilicate silane (TEOS) for surface-treatment of hardened cement-based materials: a comparison study with normal treatment agents, *Construction and Building Materials*, Volume 117, pp 144-151, 2016, (with Y., Cai, P., Hou, C., Duan, R., Zhang, Z., Zhou, X., Cheng)
- “The effects of nano-calcined kaolinite clay on cement mortar exposed to acid deposits”, *Construction and Building Materials*, Volume 102, pp 486-495, 2016 (with Y., Fan, S., Zhang, Q., Wang)
- “Studies on early stage hydration of tricalcium silicate incorporating silica nanoparticles: Part II”, *Construction & Building Materials*, Volume 102, Part 1, pp 943-949, 2016.(with Singh, L. P et al.)
- “Influence of 2D rGO nanosheets on the properties of OPC paste”, *Cement and Concrete Composites*, 70, 48-59, 2016. (with M., Murugan, M., Santhhanam, S. S., Gupta, T., Pradeep)
- “Comparative investigation on nanomechanical properties of hardened cement paste”, *Materials and Structures*, Volume 49, Issue 5, pp 1591-1604, 2016 (with Li, W., Kawashima, S., Xiao, J. & Shi, C)
- “Influence of Nanolimestone on the Hydration, Mechanical Strength and Autogenous Shrinkage of Ultrahigh-Performance Concrete”, *Journal of Materials in Civil Engineering*, volume 28, issue 1, 2016 (with Li, Huang, Shi, and Duan)
- “Surface treatment on recycled coarse aggregates with nano-materials”, *Journal of Materials in Civil Engineering*, volume 28, issue 2, 2016 (with Zhang, H. B. S., Zhao, Y. & Meng, T)

2015

- “Effects of colloidal nanoBoehmite and nanoSiO<sub>2</sub> on fly ash cement hydration”, *Construction and Building Materials*, Volume 101, Part 1, pp 246-251, 2016 (with J., Zhu, C., Feng, H., Yin, Z., Zhang)
- “Nano-modification of cementitious material: toward a stronger and durable concrete, *Journal of Sustainable Cement-Based Materials*, Volume 5, Issue 1-2, pp 1-22, 2015 (with P., Hou, M.S., Konsta-Gdoutos)
- “Influence of colloidal silica sol on fresh properties of cement paste as compared to nano-silica powder with agglomerates in micro-scale”, *Cement and Concrete Composites*, 63, 30-41, 2015 (with D., Kong, D.J., Corr, P., Hou, Y., Yang)
- “The modification Effects of Nano-Silica Slurry on Microstructure, Strength and Strain Development of Recycled Aggregate Concrete Applied in an enlarged structural test”, *Construction & Building Materials*, volume 95, pp 721-735, 2015 (with Zhao, Zhang and Meng)
- “Effects of nano-silica and nano-limestone on flowability and mechanical properties of ultra-high-performance concrete”, *Construction & Building Materials*, volume 95, pp 366-374, 2015 (with Li, Huang, and Sun)
- “Effects of nano-kaolinite clay on the freeze-thaw resistance of concrete,” *Cement and Concrete Composites*, volume 62, pp.1-12, 2015, (with Fan, Zhang and Wang)
- “Nanomechanical investigation of the effects of nanoSiO<sub>2</sub> on C–S–H gel/cement grain interfaces”, *Cement and Concrete Composites*, 61, 2015, 7–17, (with Xu, J. & Corr, D. J)
- “Characteristics of surface-treatment of nano-SiO<sub>2</sub> on the transport properties of hardened cement pastes with different water-to-cement ratios”, *Cement and Concrete Composites*, 55, 2015, 26–33, (with Hou, P., Cheng, X., Qian, J., Zhang, R. & Cao, W)
- “Studies on early stage hydration of tricalcium silicate incorporating silica nanoparticles: Part I”, *Construction and Building Materials*, 74, 2015, 278–286, (with Singh, L. P., Bhattacharyya, S. K., Mishra, G., Ahalawat, S., & Sharma, U).
- “Experimental study of the interfacial transition zone (ITZ) of model rock-filled concrete (RFC)”, *Cement and Concrete Composites*, 55, 2015, 223–231, (with Xie, Y., Corr, D. J., Jin, F. & Zhou, H)
- “Ultrasonic monitoring of the setting of cement-based materials: Frequency dependence”, *Construction and Building Materials*, 65(0), 2015, 518–525, (with Yim, H. J. & Kim, J. H)
- “Effects of the pozzolanic reactivity of nanoSiO<sub>2</sub> on cement-based materials”, *Cement and Concrete Composites*, 55, 2015, 250–258, (with Hou, P., Qian, J. & Cheng, X).
- “Nanomechanical properties of C-S-H gel/cement grain interface by using nanoindentation and modulus mapping”, *Journal of Zhejiang University SCIENCE A*, January 2015, Volume 16, Issue 1, pp 38-46, (with Jing Xu & David J. Corr).
- “Experimental Study on the Interfacial Transition Zone (ITZ) of Model Rock-Filled Concrete”, *Cement and Concrete Composites*, Vol. 55, January 2015 (available online), (with Yuetao Xie, David J Corr, Feng Jin and Hu Zhou)

2014

- “Experimental Investigation on Quantitative Nanomechanical Properties of Cement Paste”, *ACI Materials Journal*, Vol. 111, Issue no. 1-6, December – January 2014. (with Wengui Li, Jianzhuang Xiao, Shiho Kawashima, Gajendra S. Shekhawat)

- “Influence of kaolinite clay on the chloride diffusion property of cement-based materials.” *Cement and Concrete Composites*, 45(0), 117–124. (with Fan, Y., Zhang, S., Kawashima, S.)
- “Preface”, *Cement and Concrete Composites*, 54, 2014, (with Wang, K., & Khayat, K. H)<sup>[P]<sub>SEP</sub>]</sup>
- “Effects and mechanisms of surface treatment of hardened cement-based materials with colloidal nanoSiO<sub>2</sub> and its precursor.” *Construction and Building Materials*, 53(0), 2014, 66–73. (with Hou, P., Cheng, X. & Qian, J).
- “Experimental study on mechanical properties of interfacial transition zones in recycled aggregate concrete”, *Hunan Daxue Xuebao/Journal of Hunan University Natural Sciences*, 41(12), 2014, 31–39. (with Li, W. G., Xiao J. Z., & Huang, L.)
- “Influence of purified attapulgite clays on the adhesive properties of cement pastes as measured by the tack test.” *Cement and Concrete Composites*, 48(0), 35–41. (with Kawashima, S., Chaouche, M., Corr, D. J).
- “Experimental study of filling capacity of self-compacting concrete and its influence on the properties of rock-filled concrete.” *Cement and Concrete Research*, 56(0), 121–128. (with Xie, Y., Corr, D. J., Chaouche, M., Jin, F)
- “Ultrasonic monitoring of the setting of cement-based materials: Frequency dependence.” *Construction and Building Materials*, 65(0), 518–525. (with Yim, H. J., Kim, J. H).
- “Dispersion of CaCO<sub>3</sub> nanoparticles by sonication and surfactant treatment for application in fly ash cement systems”, *Materials and Structures*, Vol. 47, Issue 6, pp1011-1023. (with Kawashima, Shiho and Seo, Jung-WooTed, Corr, David and Hersam, Mark C)

#### 2013

- “Effects of interfacial transition zones on the stress–strain behavior of modeled recycled aggregate concrete.” *Cement and Concrete Research*, 52(0), 82–99. (with Xiao, J., Li, W., Corr, D. J)
- “Rate of thixotropic rebuilding of cement pastes modified with highly purified attapulgite clays”, *Cement and Concrete Research*, Vol 53, November 2013, pp 112–118 (with S. Kawashima, M. Chaouche, D.J. Corr)
- “Cement particle flocculation and breakage monitoring under Couette flow”, *Cement and Concrete Research*, Vol. 53, November 2013, pp 36–43 (with H.J. Yim and J.H. Kim)
- “A novel evidence for the formation of semi-permeable membrane surrounding the Portland cement particles during the induction period”, *Journal of Thermal Analysis and Calorimetry*, Vol 113, Issue 2, pp 881-884, 2013. (with Hou, Pengkun and Kong, Deyu and Kawashima, Shiho and Qian, Jueshi and Corr, David J).
- “Aggregation and Breakage Kinetics of Fresh Cement Paste”, *Cement and Concrete Research*, Vol. 50, August 2013, pp 1-10 (with R.D. Ferron, E. Fuente, C. Negro)
- “Carbon Nanofiber Cementitious Composites: Effect of Debulking Procedure on Dispersion and Reinforcing Efficiency”, *Cement and Concrete Composites*, Vol. 36, Special issue: Nanotechnology in Construction, February 2013, pp 25-32 (with Z.S. Metaxa, M.S. Konsta-Gdoutos)
- “Preface to special issue on: Nanotechnology in construction”, *Cement and Concrete Composites*, Vol 36, Special issue: Nanotechnology in Construction, February 2013, pp 1-2 (with M.S. Konsta-Gdoutos)
- “Modification Effects of Colloidal NanoSiO<sub>2</sub> on Cement Hydration and Its Gel Property,” *Composites Part B: Engineering*, Vol. 45, No. 1, February 2013, pp. 440-448 (with P. Hou, S. Kawashima, D. Kong, and D. Corr)

- “Modification of Cement-based Materials with Nanoparticles”, *Cement and Concrete Composites*, Vol 36, Special issue: Nanotechnology in Construction, February 2013, pp 8-15 (with S. Kawashima, P. Hou, and D. Corr)
- "Simulation study on the stress distribution in modeled recycled aggregate concrete under uniaxial compression," Accepted by *ASCE J. Materials in Civ. Eng.*, (with J. Xiao, W. Li, and D.J. Corr)
- "Crack Propagation in Recycled Aggregate Concrete under Uniaxial Compressive Loading, accepted by *ACI materials Journal*, (J. Xiao, W. Li, and Z. Sun)
- “Properties of Interfacial Transition Zones in Recycled Aggregate Concrete Tested by Nanoindentation”, *Cement & Concrete Composites*, Vol. 37, January 2013, pp 276–292 (with J. Xiao, W. Li, Z. Sun, D.A. Lange)
- “Influence of nano-silica agglomeration on fresh properties of cement pastes.” *Construction and Building Materials*, 43(0), 557–562. (with Kong, D., Su, Y., Du, X., Yang, Y., Wei, S.)
- “Effect of low dosages of waste {GRP} dust on fresh and hardened properties of mortars: Part 1.” *Construction and Building Materials*, 47(0), 1532–1538. (with Tittarelli, F)

## 2012

- “Effects of Colloidal NanoSiO<sub>2</sub> on Fly Ash Hydration,” *Cement and Concrete Composites* 34 (2012) 1095–1103 (with P. Hou, K. Wang, J. Qian, S. Kawashima, and D. Kong)
- “Fresh concrete and its significance for sustainability”, *Journal of Sustainable Cement-Based Materials*, Vol. 1, Nos. 1–2, March–June 2012, pp 16–23 (with J.H. Kim, R.P. Ferron)
- “Effects of Colloidal Nanosilica on Rheological and Mechanical Properties of Fly Ash-Cement Mortar,” *Cement and Concrete Composites*, Vol. 34, No. 10, November 2012, pp. 1095-1103 (with P. Hou, S. Kawashima, K. Wang, D. Corr, and J. Qian)
- “Study of the Mechanisms Underlying the Fresh-state Response of Cementitious Materials Modified with Nanoclays,” *Construction and Building Materials*, Vol. 36, November 2012, pp. 749-757 (with S. Kawashima, J.H. Kim, and D. Corr)
- “Interfacial Transition Zones in Recycled Aggregate Concrete with Different Mixing Approaches,” *Construction and Building Materials*, Vol. 35, October 2012, pp. 1045-1055 (with W. Li, J. Xiao, Z. Sun, and S. Kawashima)
- “On the identification of rheological properties of cement suspensions: Rheometry, Computational Fluid Dynamics modeling and field test measurements,” *Cement and Concrete Research*, Vol. 42, No. 8, August 2012, pp. 1134-1146 (with L. Ferrara, M. Cremonesi, N. Tregger, and A. Frangi)
- "Highly Concentrated Carbon Nanotube Admixture for Nano-Fiber Reinforced Cementitious Materials", *Cement & Concrete Composites*, Vol. 34, No. 5, May 2012, pp. 612-617 (Z.S. Metaxa, J-W. T. Seo, M.S. Konsta-Gdoutos, and M.C. Hersam)

2011

- “Influence of Clays on the Shrinkage and Cracking Tendency of SCC,” *Cement and Concrete Composites*, Vol. 34, No. 4, April 2012, pp. 478-485 (with X. Gao, S. Kawashima, and X. Liu)
- “Correlating Dynamic Segregation of Self-Consolidating Concrete to the Slump-Flow Test,” *Construction and Building Materials*, Vol. 28, No. 1, March 2012, pp. 499-505 (with N. Tregger, A. Gregori, and L. Ferrara)
- “Guidelines for Design, Testing, Production and Construction of Semi-Flowable Self-Consolidating Concrete for Slip-Form Paving,” *International Journal of Pavement Engineering*, Taylor & Francis, DOI: 10.1080/10298436.2011.610797, Sept 2011, pp. 1-10 (with G. Lomboy, K. Wang, and P. Taylor)
- “Early-Age Autogenous and Drying Shrinkage Behavior of Cellulose Fiber-Reinforced Cementitious Materials,” *Cement and Concrete Composites*, Vol. 33, No. 2, February 2011, pp. 201-208 (with S. Kawashima)
- “Effect of Wall Friction on Variation of Formwork Pressure Over Time in Self-Consolidating Concrete,” *Cement and Concrete Research*, Vol. 41, No. 1, January 2011, pp. 90-101 (with S.H. Kwon, Q.T. Phung, H.Y. Park, and J.H. Kim)
- “Simple Analytical Model for Formwork Design of Self-Consolidating Concrete,” *ACI Materials Journal*, Vol. 108, No. 1, January 2011, pp. 38-45 (with J.H. Kim, M. Beacraft, and S.H. Kwon)

2010

- “Effect of Mineral Admixtures on Formwork Pressure of Self-Consolidating Concrete,” *Cement Concrete and Composite*, Vol. 32, No. 9, October 2010, pp. 665-671 (with J. H. Kim and M. Beacraft)
- “Highly Dispersed Carbon Nanotube Reinforced Cement Based Materials,” *Cement and Concrete Research*, Vol. 40, No. 7, July 2010, pp. 1052-1059 (with M. S. Konsta-Gdoutos and Z. S. Metaxa)
- “Artificial Neural Network Modeling of Early Age Dynamic Young’s Modulus of Normal Concrete,” *ACI Materials Journal*, Vol. 107, No. 3, May-June, 2010, pp. 282-291 (with G. Venkateela, A. Gregori, and Z. Sun)
- “Small Changes Can Make a Great Difference,” *Transportation Research Record*, Vol. 2141, May 2010, pp. 1-5 (with J. J. Gaitero, I. Campillo, and P. Mondal)
- “Comparative Study of the Effects of Microsilica and Nanosilica in Concrete,” *Transportation Research Record*, Vol. 2141, May 2010, pp. 6-9 (with P. Mondal, L. D. Marks and J. J. Gaitero)
- “Influence of Micro- and Nanoclays on Fresh State of Concrete,” *Transportation Research Record*, Vol. 2141, May 2010, pp. 68-74 (with N. A. Tregger and M. Pakula)
- “Observation of Cement Paste Microstructure Evolution,” *Transportation Research Record*, Vol. 2141, May 2010, pp. 75-81 (with G. Venkateela and Z. Sun)
- “The Fresh State: From Macroscale to Microscale to Nanoscale,” *Transportation Research Record*, Vol. 2141, May 2010, pp. 89-91 (with R. D. Ferron)
- “Atomic Force Acoustic Microscopy to Measure Nanoscale Mechanical Properties of Cement Pastes,” *Transportation Research Record*, Vol. 2141, May 2010, pp. 102-108 (with J. H. Kim and O. Balogun)
- “Carbon Nanofiber-Reinforced Cement-Based Materials,” *Transportation Research Record*, Vol. 2142, May 2010, pp. 114-118 (with Z. S. Metaxa and M. S. Konsta-Gdoutos)

- “American Road Map for Research for Nanotechnology-Based Concrete Materials,” *Transportation Research Record*, Vol. 2142, May 2010, pp. 130-137 (with B. Birgisson, P. Taylor, and J. Armaghani)
- “Improvement of Fresh-State Concrete through Small Additions of Clay,” *ACI Committee 267 Special Publication: Advances in the Material Science of Concrete SP-270*, J. H. Ideker and A. Radlinska ed., March 2010, pp. 51-66 on disk (with N. Tregger, R. Ferron, M. Beacraft, J. H. Kim, and K. Kuder)
- “Cement-Based Materials Characterization at Nanoscale: Nanoindentation and Ultrasonic Atomic Force Microscopy,” *ACI Committee 267 Special Publication: Advances in the Material Science of Concrete SP-270*, J. H. Ideker and A. Radlinska ed., March 2010, pp. 67-76 on disk (with J. H. Kim and P. Mondal)
- “Mechanical Properties and Nanostructure of Cement-Based Materials Reinforced with Carbon Nanofibers and Polyvinyl Alcohol (PVA) Microfibers,” *ACI Committee 267 Special Publication: Advances in the Material Science of Concrete SP-270*, J. H. Ideker and A. Radlinska ed., March 2010, pp. 115-124 on disk (with Z. Metaxa and M. S. Konsta-Gdoutos)
- “Influence of Clays on the Rheology of Cement Pastes,” *Cement and Concrete Research*, Vol. 40, No. 3, March 2010, pp. 384-391 (with N. A. Tregger and M. E. Pakula)
- “Multi-Scale Mechanical and Fracture Characteristics and Early-Age Strain Capacity of High Performance Carbon Nanotube/Cement Nanocomposites,” *Cement and Concrete Composites*, Vol. 32, No. 2, February 2010, pp. 110-115 (with M. S. Konsta-Gdoutos and Z. S. Metaxa)
- “Intrinsic Model to Predict Formwork Pressure,” *ACI Materials Journal*, Vol. 107, No. 1, January-February 2010, pp. 20-26 (with S. H. Kwon, Q. T. Phung, J. H. Kim and Y. Lee)
- “Predicting Dynamic Segregation of Self-Consolidating Concrete from the Slump-Flow Test,” *Journal of ASTM International*, Vol. 7, No. 1, January 2010, Paper ID: JAI101970 (with N. Tregger N and L. Ferrara)

2009

- “Cracking Behavior of Concrete with Shrinkage Reducing Admixtures and PVA Fibers,” *Cement and Concrete Composites*, Vol. 31, No. 10, November 2009, pp. 699-704 (with A. Passuello and G. Moriconi)
- “Carbon Nanotubes Reinforced Concrete” *ACI Committee 267 Special Publication: Nanotechnology of Concrete: The Next Big Thing Is Small SP-267*, K. Sobolev and M. Reda Taha ed., October 2009, pp. 11-20, on disk (with Z. Metaxa and M. S. Konsta-Gdoutos)
- “Fatigue Crack Growth Prediction in Concrete Slabs”, *International Journal of Fatigue*, Vol 31, Issues 8–9, August–September 2009, pp 1309–1317 (with C. Gaedicke and J. Roesler)
- “Properties of Early-age Concrete Monitored with Two Nondestructive Testing Methods,” *ASCE Journal of Materials in Civil Engineering*, Vol. 21, No. 9, September 2009, pp. 476-483 (with J.H. Kim, Z. Sun, and H.G. Kwak).
- “Flocculation in Cement Pastes Measured through Use of Laser Microscopy,” *ACI Committee 231 Special Publication: Transition From Fluid to Solid: Re-examining the Behavior of Concrete at Early Ages SP-259*, K. Riding ed., February 2009, pp. 107-120, on disk (with R.P. Ferron and C. Negro)
- “Flocculation Behavior of Cement Pastes Containing Clays and Fly Ash,” *ACI Committee 231 Special Publication: Transition From Fluid to Solid: Re-examining the Behavior of Concrete at Early Ages SP-259*, K. Riding ed., February 2009, pp. 139-150 (with N. Tregger and H. Knai)
- “Importance of Processing in Advanced Cement-Based Products,” *ACI Committee 549 Special Publication: Fabrication Technologies for Thin Cementitious Products, SP-260*, Y. Shao and A. Dubey eds., 2009, pp. 1-16, on disk (with K.G. Kuder)

“Nailable Extruded HPFRCC for Use in Residential Building Applications,” *ACI Committee 549 Special Publication: Fabrication Technologies for Thin Cementitious Products, SP-260*, Y. Shah and A. Dubey eds., 2009, pp. 29-44, on disk (with K.G. Kuder)

2008

“Experimental Simulation of Self-Consolidating Concrete Formwork Pressure,” *ACI Materials Journal*, Vol. 105, No. 1, January/February 2008, pp. 97-104 (with A. Gregori, R. Ferron, and Z. Sun)

“Nanoscale Characterization of Cementitious Materials,” *ACI Materials Journal*, Vol. 105, No. 2, March/April 2008, pp. 174-179 (with P. Mondal and L.D. Marks)

“Correlation among Fresh State Behavior, Fiber Dispersion, and Toughness Properties of SFRCs,” *Journal of Materials in Civil Engineering*, Vol. 20, No. 7, July 2008, pp. 493-501 (with L. Ferrera and Y. Park)

“Next Horizon in High Performance Concrete: Self-consolidating Concrete and Nanotechnology,” *The Indian Concrete Journal*, Vol. 82, No. 1, January 2008, pp. 9-21 (with P. Mondal, R. Ferron, N. Tregger, and Z. Sun)

“Effect of Specimen Size on Fracture Energy and Softening Curve of Concrete: Part I. Experiments and Fracture Energy,” *Cement and Concrete Research*, Vol. 38, No. 8-9, August 2008, pp. 1049-1060 (with Z.F. Zhao and S.H. Kwon)

“Effect of Specimen Size on Fracture Energy and Softening Curve of Concrete: Part II. Inverse Analysis and Softening Curve,” *Cement and Concrete Research*, Vol. 106, No. 8-9, August 2008, pp. 1061-1069 (with S.H. Kwon and Z.F. Zhao)

“Prediction of Early-Age Cracking of Fiber-Reinforced Concrete due to Restrained Shrinkage,” *ACI materials Journal*, Vol. 105, No. 4, July/August 2008, pp. 381-389 (with S.H. Kwon)

“Steel Fibers in SCC for Structural Applications,” *Precast inc. Magazine*, November/December 2008, pp. 24-31 (with L. Ferrera)

“News on Nanotechnology,” *Public Roads*, November/December 2008, pp. 42-48 (with R. Ferron, N. Tregger, and Z. Sun)

“Identifying Viscosity of Cement Paste from Mini-Slump-Flow Test,” *ACI Journal*, November 2008, Vol. 105, No. 6, pp. 558-566 (with N. Tregger and L. Ferrara)

“Use of Atomic Force Microscopy and Nanoidentation for Characterization of Cementitious Materials at the Nanoscale,” *ACI Journal SP-254*, October 2008, pp. 41-56 (with P. Mondal and L.D. Marks)

2007

“Modeling the elastic properties of concrete composites: experiment, differential effective medium theory, and numerical simulation,” *Cement and Concrete Composites*, Vol. 29, No. 1, January 2007, pp. 22-38 (with Z. Sun, and E.J. Garboczi)

“Activations and Properties of Cementitious Materials Made with Cement-Kiln Dust and Class F Fly Ash,” *Journal of Materials in Civil Engineering*, Vol. 19, No. 1, January 2007, pp. 112-119 (with K. Wang and A. Mishulovich)

“Comparison of Two Accelerated Corrosion Techniques for Concrete Structures,” *ACI Structures Journal*, Vol. 104, No. 3, May/June 2007, pp. 344-347 (with Y. Yuan and Y. Ji)

“Rheological Method to Evaluate the Thixotropy of Cement Pastes for SCC,” *ACI Materials Journal*, Vol. 104, No. 3, May/June 2007, pp. 242-250 (with R. Ferron, A. Gregori, and Z. Sun)

- “Low Compaction Energy Concrete for Improved Slip Form Casting of Concrete Pavements,” *ACI Materials Journal*, Vol. 104, No. 3, May/June 2007, pp. 251-258 (with B.Y. Pekmezci, T. Voigt, and K. Wang)
- “Rheology of Extruded Cement-Based Materials,” *ACI Materials Journal*, Vol. 104, No. 3, May/June 2007, pp. 283-290 (with K.G. Kuder)
- “The Corrosion Resistance of Coated Steel Dowels Determined by Impedance Spectroscopy,” *Cement and Concrete Research*, Vol. 37, No. 7, July 2007, pp. 1134-1143 (with D. Jolivet and D. Bonen)
- “A Method for Mix-Design of Fiber-Reinforced Self-Compacting Concrete,” *Cement and Concrete Research*, Vol. 37, No. 6, June 2007, pp. 957-971 (with L. Ferrara and Y. Park)
- “Rheology of Fiber-reinforced Cementitious Materials,” *Cement and Concrete Research*, Vol. 37, No. 2, February 2007, pp. 191-199 (with K. Kuder, N. Ozyurt, and E. Mu)
- “Developing a Falling-Ball Viscometer for Highly Flowable Cement-Based Materials,” *ACI Materials Journal*, Vol. 104, No. 2, March/April 2007, pp. 180-186 (with Z. Sun, A. Gregori, and R. Ferron)
- “Tailoring Extruded HPFRCC to be Nailable,” *ACI Materials Journal*, Vol. 104, No. 5, September 2007, pp. 526-534 (with K.G. Kuder)
- “Correlation of fiber Dispersion, Rheology and Mechanical Performance of FRCs,” *Cement and Concrete Composites*, Vol. 29, No. 2, February 2007, pp. 70-79 (with N. Ozyurt and T.O. Mason)
- “Digital Image Correlation Analysis of Interfacial Debonding Properties and Fracture Behavior in Concrete,” *Engineering Fracture Mechanics*, Vol. 74, Issue 1-2, January 2007, pp 109-121 (with D. Corr, M. Accardi, L. Graham-Brady)
- “Effect of Supplementary Cementitious Materials on Shrinkage and Crack Development in Concrete,” *Cement and Concrete Composites*, Vol. 29, Issue 2, February 2007, pp 117-123 (with Y. Akkay, C. Ouyang)
- “Modeling Mesoscale Uncertainty for Concrete in Tension,” *Computers and Concrete*, Vol. 4, No. 5, October 2007, pp. 347-362 (with N. Tregger, D. Corr, and L. Graham-Brady)
- “A Reliable Technique to Determine the Local Mechanical Properties at the Nanoscale for Cementitious Materials,” *Cement and Concrete Research*, Vol. 37, No. 10, October 2007, pp. 1440-1444 (with P. Mondal and L. Marks)
- “Cracking of Fiber-Reinforced Self-Compacting Concrete due to Restrained Shrinkage,” *International Journal of Concrete Structures and Materials*, Vol. 1, No. 1, December 2007, pp. 3-9 (with S. Kwon, R. Ferron, and Y. Akkaya)
- “New technique for improvement on reactivity of cement industry wastes,” *Advances in Applied Ceramics*, Vol. 106, No. 5, October 2007, pp. 226-230, (with V.K. Bui and J. Ryou)
- “The Role of Fiber Dispersion on Toughness and Deflection Stiffness Properties of SFRC’s, *ACI SP 248 Stiffness and Deflection issues in FRC and thin structural elements*, P. Bischoff and F. Malhas eds., September 1, 2007, pp. 83-100 (with L. Ferrara and Y.-D. Park)

2006

- “Rheometric and Ultrasonic Investigations of Viscoelastic Properties of Fresh Portland Cement Pastes,” *Cement and Concrete Research*, Vol. 36, No. 2, February 2006, pp. 278-287 (with Z. Sun and T. Voigt)
- “Green and Early Age Compressive Strength of Extruded Cement Mortar Monitored with Compression Tests and Ultrasonic Techniques,” *Cement and Concrete Research*, Vol. 36, No. 5, May 2006, pp. 858-867 (with T. Voigt and T. Malonn)



- “Recycling of Cement Industry Wastes by Grinding Process,” *Advances in Applied Ceramics*, Vol. 105, No. 6, December 2006, pp. 274-279 (with J. Ryou and M.S. Konsta-Gdoutos)
- “Factors Affecting the Resistance of Cementitious Materials at High Temperatures and Medium [0] Heating Rates,” *Materials and Structures*, Vol. 39, No. 4, May 2006, pp. 455-469 (with D. Matesova and D. Bonen)
- “Monitoring Fiber Dispersion in Fiber-Reinforced Cementitious Materials: Comparison of AC-Impedance Spectroscopy and Image Analysis,” *ACI Materials Journal*, Vol. 103, No. 5, September/October 2006, pp. 340-347 (with N. Ozyurt, L.Y. Woo, and T.O. Mason)
- “Non-Destructive Monitoring of Fiber Orientation Using AC-IS: An Industrial-Scale Application,” *Cement and Concrete Research*, Vol. 36, No. 9, September 2006, pp. 1653-1660 (with N. Ozyurt and T.O. Mason)
- “New Method to Evaluate the Nailing Performance of Extruded High-Performance Fiber-Reinforced Cementitious Composites for Residential Applications,” *ASCE Journal of Materials in Civil Engineering*, Vol. 18, No. 3, May/June 2006, pp. 443-452 (with K.G. Kuder and E.B. Mu)
- “Comparison of the Ultrasonic Wave Reflection Method and Maturity Method in Evaluating the Compressive Strength,” *Cement and Concrete Composites*, Vol. 28, No. 4, April 2006, pp. 307-316 (with T. Voigt and Z. Sun)

#### 2005

- “Influence of Ultrafine Fly Ash on the Early Age Response and the Shrinkage Cracking Potential of Concrete,” *Journal of Materials in Civil Engineering*, Vol. 17, No. 1, January/February 2005, pp. 1-9 (with K.V. Subramaniam, R. Gromotka, K. Obla, and R. Hill)
- “Corrosion Resistance of Functionally Graded Coatings on Plain Steel Rebars,” *Journal of Advanced Concrete Technology*, Vol. 3, No. 1, February 2005, pp. 69-75 (with J. Ryou, T. Voigt, M. KonstaGdoutos, D. Varacalle Jr. and T. Mason)
- “Microstructure and Early-Age Properties of Portland Cement Paste—Effects of Connectivity of Solid Phases,” *ACI Materials Journal*, Vol. 102, No. 2, March/April 2005, pp. 122-129 (with Z. Sun and G. Ye)
- “Fresh and Hardened Properties of Self-Consolidating Concrete,” *Progress in Structural Engineering Materials*, Vol. 7, No. 1, 2005, pp. 14-26 (with D. Bonen)
- “Temperature Effects on Strength Evaluation of Cement-Based Materials with Ultrasonic Wave Reflection Technique,” *ACI Materials Journal*, Vol. 102, No. 4, July/August 2005, pp. 272-278 (with Z. Sun and T. Voigt)
- “Effects of Matrix Modification on Durability of Glass Fiber Reinforced Cement Composite,” *Materials and Structures Journal*, Vol. 38, No. 2, March 2005, pp. 163-171 (with A. Peled and J. Jones)
- “Fatigue Behavior on Concrete Subjected to Biaxial Loading in the Compression Region,” *Materials and Structures Journal*, Vol. 38, No. 3, April 2005, pp. 289-298 (with B. Mu)
- “Early Age Microstructure of Portland Cement Mortar Investigated by Ultrasonic Shear Waves and Numerical Simulation,” *Cement and Concrete Research*, Vol. 35, No. 5, May 2005, pp. 858-866 (with T. Voigt, G. Ye, Z. Sun, and K van Breugel)
- “Comparison of Ultrasonic Wave Transmission and Reflection Measurements with P- and S-Waves on Early Age Mortar and Concrete,” *Materials and Structures Journal*, Vol. 38, No. 8, October 2005, pp. 729-738 (with T. Voigt, C.U. Grosse, Z. Sun, and H.-W. Reinhardt)

- “Modeling the Linear Elastic Properties of Portland Cement Paste,” *Cement and Concrete Research*, Vol. 35, No. 10, October 2005, pp. 1948-1960 (with C.J. Haecker, E.J. Garboczi, J.W. Bullard, R.B. Bohn, Z. Sun, and T. Voigt)
- “Microfiber and Macrofiber Hybrid Fiber-Reinforced Concrete,” *Journal of Materials in Civil Engineering*, Vol. 17, No. 5, October 2005, pp. 595-604 (with J.S. Lawler and D. Zampini)
- “Procedure to Interpret Electrical Conductivity Measurements in Cover Concrete During Rewetting,” *Journal of Materials in Civil Engineering*, Vol. 17, No. 5, September/October 2005, pp. 586-594 (with F. Rajabipour, W.J. Weiss, J.D. Shane, and T.O. Mason)
- “Cast-in-Place Cellulose Fiber-Reinforced Cement Paste, Mortar, and Concrete,” *ACI Materials Journal*, Vol. 102, No. 5, September 2005, pp. 299-306 (with J. R. Rapoport)
- “Monitoring the Setting Behavior of Cementitious Materials using One-sided Ultrasonic Measurements,” *Cement and Concrete Research*, Vol. 35, No. 5, May 2005, pp. 850-857 (with K.V. Subramaniam, J. Lee, and B. Christensen)
- 2004
- “Effects of curing temperature and NaOH addition on hydration and strength development of clinker-free CKD-fly ash binders,” *Cement and Concrete Research*, Vol. 34, No. pp. 299-309 (with K. Wang and A. Mishulovich)
- “A generalized approach for the determination of yield stress by slump and slump flow,” *Cement and Concrete Research*, Vol. 34, No. 2004, pp. 363-371 (with A. Saak and H. Jennings)
- “Drying shrinkage of concrete reinforced with fibers and welded- wire fabric,” *ACI Materials Journal*, Vol. 101, No. 3, May/June 2004, pp. 233-241 (with T. Voigt and V.K. Bui)
- “Nondestructive testing of early-age concrete with an ultrasonic wave reflection method,” *Bautechnik*, Vol. 81, No. 6, 2004, pp. 468-479 [in German] (with T. Voigt and F. Dehn)
- “Properties of Early-Age Portland Cement Mortar Monitored with Shear Wave Reflection Method,” *ACI Materials Journal*, Vol. 101, No. 6, November/December 2004, pp. 473-482 (with T. Voigt)
- “Failure Mechanism of Concrete under Fatigue Compressive Load,” *Journal of Materials in Civil Engineering*, November/December 2004, vol. 16, no. 6, pp. 566-572 (with B. Mu and K.V. Subramaniam)
- “Length Effect on Ductility of Concrete in Uniaxial and Flexural Compression,” *ACI Structural Journal*, November/December 2004, vol.101, no. 6, pp. 765-772 (with J.U.A. Borges, K.V. Subramaniam, W.J. Weiss and T.N. Bittencourt)
- “Characterizing Fiber Dispersion in Cement Composites Using AC-Impedance Spectroscopy,” *Journal of Cement & Concrete Composites*, 2004 (with L.Y. Woo, S. Wansom, N. Ozyurt, B. Mu, T.O. Mason)
- 2003
- “Effect of Mechanochemical Activation of Reactivity of Cement Kiln Dust-Fly Ash Systems,” *ACI Materials Journal*, January/February 2003, vol. 100, no. 1, pp. 55-62. (with P.M. Babaian, K. Wang, A. Mishulovich and S. Bhattacharja)
- “Measurement of Surface Wave Transmission Coefficient Across Surface-Breaking Cracks and Notches in Concrete,” *Journal of the Acoustical Society of America*, February 2003, vol. 113, no. 2, pp. 717- 725. (with W. Song, J.S. Popovics, and J. Aldrin)
- “Processing Effects in Cementitious Composites: Extrusion and Casting,” *Journal of Materials in Civil Engineering*, March/April 2003, vol. 15, no. 2, pp. 192-199. (with A. Peled)

- “Determination of Early Age Mortar and Concrete Strength by Ultrasonic Wave Reflections,” *Journal of Materials in Civil Engineering*, May/June 2003, vol. 15, no. 3, pp. 247-254. (with T. Voigt and Y. Akkaya)
- “Analysis of Architectural Concrete of Baha’i Temple,” *ACI Materials Journal*, May/June 2003, vol. 100, no. 3, pp. 222- 227. (with Y. Akkaya, A. Eckerson, and M.S. Konsta-Gdoutos)
- “Hydration and Properties of Novel Blended Cements Based on Cement Kiln Dust and Blast Furnace Slag,” *Cement and Concrete Research*, 33, 2003, pp. 1269-1276 (with M. Knosta-Gdoutos)
- “Fracture Processes of Hybrid-Reinforced Mortar,” *Materials and Structures*, April 2003, vol. 36, pp. 197-208. (with J.S. Lawler, T. Wilhem, and D. Zampini)
- “Influence of Fiber Dispersion on the Performance of Microfiber Reinforced Cement Composites,” *ACI Special Publications 216: Innovations in Fiber-Reinforced Concrete for Value*, 2003, SPS-216-1. (with y. Akkaya and M. Ghandehari)
- “Effects of Pressure on Resistance to Freezing and Thawing of Fiber-Reinforced Cement Board,” *ACI Materials Journal*, November/December, 2003, vol. 100, no. 6, pp. 463-468 (with K. Kuder)
- “Nondestructive Measurement of Concrete Strength Gain by an Ultrasonic Wave Reflection Method,” *Materials and Structures*, October 2003, vol. 36, pp. 507-514. (with Y. Akkaya, T. Voigt, and K.V. Subramaniam)

2002

- “Restrained Shrinkage Cracking: the Role of Shrinkage Reducing Admixtures and Specimen Geometry,” *RILEM Materials and Structures Journal*, March 2002, vol. 35, pp. 85-91. (with W.J. Weiss)
- “Fatigue Fracture of Concrete Subjected to Biaxial Stresses in the Tensile C-T Region,” *Journal of Engineering Mechanics*, June 2002, vol. 128, no. 6, pp. 668-676. (with K.V. Subramaniam, J.S. Popovics)
- “Permeability of Cracked Steel Fiber-Reinforced Concrete,” *Journal of Materials in Civil Engineering*, July/August 2002, vol. 14, no 4, pp. 355-358. (with J. Rapoport, C. Aldea, B. Ankenman, and A. Karr)
- “Hydration, Rheology, and Strength of Ordinary Portland Cement (OPC)—Cement Kiln Dust (CKD)—Slag Binders,” *ACI Materials Journal*, March/April 2002, vol. 99, no. 2, pp. 173-179. (with K.Wang and M.S. Konsta-Gdoutos)
- “Permeability of Cracked Hybrid Fiber-Reinforced Mortar under Load,” *ACI Materials Journal*, JulyAug. 2002, vol. 99, no.4, pp. 379-385. (with J.S. Lawler and D. Zampini)
- “Rheological Model for Self-Consolidating Concrete,” *ACI Materials Journal*, November/December 2002, vol. 99, no 6, pp. 549-559. (with V.K. Bui and Y. Akkaya)
- “An Ultrasonic Technique for Monitoring Concrete Strength at an Early Age,” *ACI Materials Journal*, September 2002, vol. 99, no. 5, pp. 458-462. (with K.V. Subramaniam, J.P. Mohsen, and C.K. Shah)
- 2001
- “Effect of Fiber Dispersion on Multiple Cracking of Cement Composites,” *Journal of Engineering Mechanics*, April 2001, vol. 127, no. 4, pp. 311-316. (with Y. Akkaya and B. Ankenman)
- “The Influence of Wall Slip on Yield Stress and Viscoelastic Measurements of Cement Paste,” *Cement and Concrete Research*, February 2001, vol. 31, no. 2, pp. 205-212. (with A. Saak and H. Jennings)
- “Moire Interferometry Analysis of Fiber Debonding,” *Journal of Engineering Mechanics*, June 2001, vol. 127, no. 6, pp. 625-629. (with T. Easley and K. Faber)

- “Electrical Impedance Spectra to Monitor Damage, During Tensile Loading, of Cement Composites,” *ACI Materials Journal*, July/August 2001, vol. 98, no. 4, pp. 313-322. (with A. Peled, J.M. Torrents, T.O. Mason and E.J. Garboczi)
- “Microstructure of Extruded Cement-Bonded Fiberboard,” *Cement and Concrete Research*, August 2001, vol. 31, no. 8, pp. 1153-1161. (with Y. Shao and J. Qiu)
- “Localization and the Size-Dependent Response of Reinforced Concrete Beams,” *ACI Structural Journal*, September/October 2001, vol. 98, no. 5, pp. 686-695. (with W.J. Weiss and K. Guler)
- “New Methodology for Designing Self-Compacting Concrete,” *ACI Materials Journal*, November/December 2001, vol. 98, no. 6, pp. 429-439. (with A. Saak and H. Jennings)
- “Plastic Shrinkage Cracking in Concrete Materials—Influence of Fly Ash and Fibers,” *ACI Materials Journal*, November /December 2001, vol. 98, no. 6, pp. 458-464. (with K. Wang and P. Phuaksuk)
- “Measuring Three-Dimensional Damage in Concrete Under Compression,” *ACI Materials Journal*, November/December 2001, vol. 98, no. 6, pp. 465-475. (with J.S. Lawler and D.T. Keane)
- “Analysis of the Impedance Spectra of Short Conductive Fiber-Reinforced Composites,” *Journal of Materials Science*, 2001, pp. 4003-4012. (with J.M. Torrents, T.O. Mason, A. Peled and E.J. Garboczi)
- “A Geometry and Size Dependent Fracture Resistance Curve,” *International Journal of Fracture*, June 2001, vol. 109, no. 3, pp. 23-28 (with W. Yang)

2000

- “Predicting Shrinkage Stress Field In Concrete Slab On Elastic Subgrade,” *Journal of Engineering Mechanics*, January 2000, Vol. 126, no. 1, pp. 35-42. (with W. Yang and W. J. Weiss)
- “Influence of Specimen Size/Geometry On Shrinkage Cracking Of Rings,” *Journal of Engineering Mechanics*, January 2000, Vol. 126, no. 1, pp. 93-101. (with W. J. Weiss and W. Yang)
- “Extent of Healing of Cracked Normal Strength Concrete,” *Journal of Materials in Civil Engineering*, February 2000, Vol. 12, no.1, pp. 92-96. (with C. Aldea, W.J. Song and J. S. Popovics)
- “Effect of Healing of Cracked Normal Strength Concrete,” *Journal of Materials in Civil Engineering*, February 2000, Vol. 12, No. 1. (with C. Aldea, W. Song, and J. Popovics)
- “Determining Fracture Toughness by Unnotched Splitting Specimen,” *Concrete Science and Engineering*, March 2000, vol. 2, pp. 48-55. (with W. Yang and C. Aldea)
- “Effects of Curing Conditions on Properties of Concrete Using Slag Replacement,” *Cement and Concrete Research*, March 2000, pp. 465-472. (with C. Aldea, F. Young, and K. Wang)
- “Assessing Damage in Corroded Reinforced Concrete Using Acoustic Emission,” *Journal of Engineering Mechanics*, March 2000, Vol. 126, no. 3, pp. 273-283. (with D.J. Yoon and W. Jason Weiss)
- “Application of Surface Wave Transmission Measurements for Crack Depth Determination in Concrete,” *ACI Materials Journal*, March/April 2000, Vol. 97, pp. 127-135. (with J.S. Popovics, W.J. Song, M. Ghandehari, K. Subramaniam and J. D. Achenbach)
- “Effect of Sand Addition on Properties of Fiber-Reinforced Cement Composites,” *ACI Materials Journal*, May/June 2000, Vol. 97, No. 3, pp. 393-400, (Y. Akkaya, A. Peled, and J. Picka)
- “Assessing the Moisture Profile of Drying Concrete Using Impedance Spectroscopy,” *Concrete Science and Engineering*, June 2000, Vol. 2, pp. 106-116. (with A. Schiebl, W.J. Weiss, J.D. Shane, N.S. Berke, and T.O. Mason)

- “Statistical Studies of the Conductivity of Concrete Using ASTM c 1202-94,” *Concrete Science and Engineering*, June 2000, Vol. 2, No. 6, pp. 97-105. (with S. Jaiswal, J. Picka, T. Igusa, A. Kaar, B. Andenman and P. Styer)
- “New Directions in Concrete Health Monitoring Technology,” *Journal of Engineering Mechanics*, July 2000, pp. 754-760. (with J.S. Popovics, K.V. Subramaniam and C. Aldea)
- “Spatial Distribution of Aligned Short Fibers in Cement Composites,” *Journal of Materials in Civil Engineering*, August 2000, pp. 272-279. (with Y. Akkaya and J. Picka)
- “High Content of Fly Ash (Class F) in Extruded Cementitious Composites,” *ACI Materials Journal*, September/October 2000, vol. 97, no. 5, pp. 509-517. (with A. Peled and M. Cyr)
- “Parameters Related to Fiber Length and Processing in Fiber Reinforced Composites,” *RILEM Materials and Structures Journal*, October 2000, vol. 33, pp. 515-524. (with Y. Akkaya and A. Peled)
- “Estimation of Water Flow Through Cracked Concrete Under Load,” *ACI Materials Journal*, September/October 2000, vol. 97, no. 5. (with C. Aldea, M Ghandehari, and A. Karr)
- “Quantitative Description of Coarse Aggregate Volume Fraction Gradients,” *Journal of Cement, Concrete, and Aggregates*, December 2000, vol. 22, no. 2, pp. 133-141. (with J.D. Picka, S.S. Jaiswal, T. Igusa, and A.F. Karr)
- “Determining Elastic Properties of Concrete Using Vibrational Resonance Frequencies of Standard Test Cylinders,” *Cement, Concrete, and Aggregates*, December 2000, vol 22, no. 2, pp. 81-89. (With K.V. Subarmaniam and J.S. Popovics)
- “Crack Propagation in Flexural Fatigue of Concrete” *Journal of Engineering Mechanics*, September 2000, vol. 126, no. 9, pp. 891-898. (with S.V. Kolluru, E. F. O’Neil, and J.S. Popovics)
- “Predicting Shrinkage Stress Field In Concrete Slab On Elastic Subgrade,” *Journal of Engineering Mechanics*, January 2000, vol. 126, no. 1, pp. 35-42. (with W. Yang and W. J. Weiss)
- “Using Ultrasound to Monitor Stiffening Process of Concrete with Admixtures,” *ACI Materials Journal*, November/December 2000, vol. 97, no. 6, pp. 675-683. (with J. Rapoport, J.S. Popovics and S. Kolluru)
- “Bond-Induced Longitudinal Fracture in Reinforced Concrete,” *Journal of Applied Mechanics*, December 2000, vol. 67, pp.740-748. (with M.Ghandehari and S. Krishnaswamy)
- “Interaction between Loading, Corrosion, and Serviceability of Reinforced Concrete,” *ACI Materials Journal*, November/December 2000, vol. 97, no. 6 (with S. Yoon, K. Wang and J. Weiss)

1999

- “Use of a Crack-Bridging Single-Fiber Pullout Test to Study Steel Fiber/Cementitious Matrix Composites,” *Journal of American Ceramic Society*, 1999, pp. 3513-3520. (with T.C. Easley and K.T. Faber)
- “A Technique for Evaluating the Interaction of the Interface in Reinforced Concrete,” *ASCE Journal of Engineering Mechanics*, February 1999, Vol. 125, No.2, pp. 234-241. (with M. Ghandehari and S. Krishnaswamy)
- “The Use of Extrusion Rheometry in the Development of Extruded Fiber-Reinforced Cement Composites,” *Concrete Science and Engineering*, 1999, Vol. 1 No. 11. (with R. Srnivasan and D. DeFord)
- “Technique for Evaluating Kinematics Between Rebar and Concrete,” *Journal of Engineering Mechanics*, February 1999, Vol. 125, No. 2. (with M. Ghandehari and S. Krishnaswamy)
- “Effect of Cracking on Water and Chloride Permeability of Concrete,” *ASCE Journal of Materials in Civil Engineering*, Vol. 11, No. 3., August 1999, pp. 181-187. (with C. Aldea and A. Karr)

- “Permeability of Cracked Concrete,” *Materials and Structures*, 1999, vol. 32, no. 219, pp. 370-376, (with C.M. Aldea and A. Karr)
- “Propagation of Microcracks in Concrete Studied with Subregion Scanning Computer Vision”, *ACI Materials Journal*, March 1999, Vol. 96, No. 2, pp. 255-260. (with S. Choi)
- “Nondestructive Techniques for Studying Fracture Processes in Concrete,” *International Journal of Fracture*, 1999, Vol. 98, pp. 351-359. (with S. Choi)
- “Microstructural and Pore Solution Changes Induced by the Rapid Chloride Permeability Test Measured by Impedance Spectroscopy,” *Concrete Science and Engineering*, 1999, Vol. 1, No. 2, pp.110-119. (with J.D. Shane, C. Aldea, N.F. Bouxsein, T.O. Mason, and H.M. Jennings)
- “Effect of Microcracking on Durability of High Strength Concrete,” *Journal of the Transportation Research Board, No. 1668, Concrete in Pavements and Structures*, National Academy Press, Washington, D.C. 1999, pp. 86-90. (with C. Aldea and A. Karr)
- “Fatigue Response of Concrete Subjected to Biaxial Stresses in the Compression-Tension Region,” *ACI Materials Journal*, November/December 1999, Vol. 96, No. 6, pp. 663-669. (with K.V. Subramaniam and J.S. Popovics)
- “Pullout Resistance of Anchor Bolts: Effect of Matrix Properties,” *Concrete Science and Engineering*, Vol. 1, June 1999, pp 120-128 (with A. Peled, F. Ensslen, and M.Ghandehari)
- “Aspects of Monitoring Moisture Changes Using Electrical Impedance Spectroscopy,” *2<sup>nd</sup> International Research Seminar on Self-Desiccation & Its Importance in Concrete Technology*, June 18, 1999, pp. 31-47. (with W.J. Weiss, J.D. Shane, A. Mieses, and T.O. Mason)
- “Assessment of Microstructural Changes During the Rapid Chloride Permeability Test Using Impedance Spectroscopy Measurements,” in review, *ACISP High Performance Concrete*, March 1999. (with C. Aldea, J. Shane and T. Mason)
- “Measuring Three-dimensional Damage of Mortar in Compression with X-ray Microtomography and Digital Image Correlation,” *ACI Spring Convention*, 1999 (with J.S. Lawler and D.T. Keane)
- “Influence of Loading On Corrosion and Mechanical Response of Reinforced Concrete Elements,” *ACI High Performance Concrete Research to Practice*, SP 189, 1999, pp. 253-272. (with S.C. Yoon, H.R. Wang, and W.J. Weiss)
- “Monitoring the settling and hardening of cement-based materials with ultrasound,” *Concrete Science and Engineering*, vol. 1, June 1999, pp. 83-91 (with T. Ozturk, J. Rapoport, and J.S. Popovics)
- “Durability of Extruded Thin Sheet PVA Fiber-Reinforced Cement Composites,” *ACI SP-190 High Performance Fiber-Reinforced Concrete Thin Sheet Products*, 1999, pp. 133-164 (with P. L. Burke) 1998
- “Ultrasonic Investigation of Concrete with Distributed Damage,” *ACI Materials Journal*, January/February 1998, Vol. 95, No. 1, pp. 27-36. (with S.F. Selleck, E.N. Landis, M.L. Peterson, and J.D. Achenbach)
- “Application of Acoustic Emission Technique to Detection of Reinforcing Steel Corrosion in Concrete,” *ACI Materials Journal*, January/February 1998, Vol. 95, No. 1, pp. 68-76. (with Z. Li, F. Li, A. Zdunek, and E. Landis)
- “Shrinkage Cracking – Can it be Prevented?,” *Concrete International*, April 1998, Vol. 20, No. 4, pp. 51-55. (with J. Weiss and W. Yang)
- “Early Age Microstructure of the Paste Aggregate Interface and its Evolution,” *Materials Research Society*, July 1998, Vol. 13, No. 7, pp. 1-11. (with D. Zampini and H. Jennings)

- “Fracture Mechanism in Cement-Based Materials Subjected to Compression,” *ASCE Journal of Engineering Mechanics*, January 1998, Vol. 124, No. 1, pp. 94-102. (with S. Choi)
- “Shrinkage Cracking of Restrained Concrete Slabs,” *ASCE Journal of Engineering*, July 1998, Vol. 124, No. 7, pp. 765-774. (with J. Weiss and W. Yang)
- “Response of Reinforced Concrete Beams at High Strain Rates,” *ACI Structural Journal*, November/December 1998, Vol. 705-715, Vol. 95, No. 6. (with S.M. Kulkarni)
- “Interface Behavior in Steel Fiber/Cement Composites Under Tension,” *ASCE Journal of Engineering Mechanics*, September 1998, Vol. 1524, No. 9, pp. 1037-1044. (with Y. Shao and C. Ouyang)
- “A Method to Predict Shrinkage Cracking of Concrete,” *ACI Materials Journal*, July/August 1998, Vol. 95, No. 4, pp. 339-346. (with C. Ouyang, S. Marikunte, W. Yang and E. Becq-Giraudon)
- “Testing Concrete in Torsion: Instability Analysis and Experiments,” *Journal of Engineering Mechanics, American Society of Civil Engineers (ASCE)*, Vol.124, No.11, November 1998, pp.1258-1268. (with K. V. Subramaniam and J. S. Popovics)
- “Extruded Fiber Reinforced Cement Pressure Pipe,” *Advanced Cement Based Materials*, 1998, Vol. 8, pp. 47-55. (with C. Aldea and S. Marikunte) “The Influence of Loading Rate on Crack Bridging Processes in Al<sub>2</sub>O<sub>3</sub>,” *Acta Mater*, vol. 46, no. 10, pp. 3547-3555, 1998 (with S. Tandon and K.T. Faber)

1997

- “Prediction of Cracking Response of Reinforced Concrete Tensile Members,” *Journal of Structural Engineering*, January 1997, Vol. 123, No. 1, pp. 70-78. (with C. Ouyang, E. Wollrab, and S.M. Kulkarni)
- “Durability of Glass Fiber Reinforced Cement Composites: Effect of Silica Fume and Metakaolin,” *Advanced Cement Based Materials*, April/May 1997, Vol. 5, No. 3/4, pp. 100-108. (with S. Marikunte and C. Aldea)
- “Permeability Study of Cracked Concrete,” *Cement and Concrete Research*, January 1997, Vol. 27, No. 3, pp. 381-393. (with K. Wang and D. Jansen)
- “Strain-Softening of Concrete in Uniaxial Compression,” *Materials and Structures*, May 1997, Vol. 30, pp. 195-209. (with J.G.M. van Mier, et al.)
- “Strain-Softening of Laterally Reinforced Concrete Panels in Compression,” *ASCE Journal*, May 1997, Vol. 123, No. 5. (with K.C. Thienel)
- “Effect of Length on Compressive Strain Softening of Concrete,” *ASCE Journal of Engineering Mechanics*, January 1997, Vol. 123, No. 1, pp. 25-35. (with D. Jansen)
- “Measurement of Deformations on Concrete Subjected to Compression Using Image Correlation,” *Experimental Mechanics*, September 1997, Vol. 37, No. 3, pp. 307-313. (with S. Choi)
- “Advanced Cement-Based Composites,” *Infrastructure*, 1997 Vol. 3, No. 1, pp. 3-13 (with R. Srinivasan)
- “An Overview of the Fracture Mechanics of Concrete,” *Cement, Concrete, and Aggregates, CCAGDP*, Vol. 19, No. 2, December 1997, pp. 79-86.
- “Mechanical Properties of PVA Fiber-Reinforced Cement Composites Fabricated by Extrusion Processing,” *ACI Materials Journal*, November/December 1997, Vol. 944, No. 6, pp. 564. (with Y. Shao)
- “Control of Cracking with Shrinkage Reducing Admixtures,” *Transportation Research Record 1574*, 1997, pp. 25-36. (with S. Marikunte, W. Yang, and C. Aldea)

1996

- “Behavior of Cement Based Matrices Reinforced by Randomly Dispersed Microfibers,” *Advanced Cement Based Materials*, January 1996, Vol. 3, No.1, pp. 20-30. (with D.A. Lange and C. Ouyang)
- “Shrinkage Cracking of High Strength Concrete,” *ACI Materials Journal*, September/October 1996, Vol. 93, No. 5, pp. 1-8 (with K. Wiegrink and S. Marikunte)
- “Observation of Mixed Mode Fracture with Center Notched Disk Specimens,” *Cement and Concrete Research*, January 1996, Vol. 26, No. 1, pp. 125-137. (with Z. Jia and A. Castro-Montero)
- “An R-Curve Approach to Predict Shrinkage Cracking of Concrete,” *International Journal for Restoration of Buildings and Monuments*, 1996, Vol. 2, No. 4, pp. 307-323. (with C. Ouyang) “Relationship Between Fracture Parameters from Two Parameter Fracture Model and from Size Effect Model,” *Materials and Structures*, March 1996, No. 186, pp. 77-86.. (with C. Ouyang and T. Tang)
- “A Simple Method for Determining Material Fracture Parameters from Peak Loads,” *ACI Materials Journal*, March/April 1996, Vol. 93, No. 2. (with T. Tang and C. Ouyang)
- “Testing Concrete in Torsion: Instability Analysis and Experiments,” *ASCE Journal of Engineering Mechanics*, November 1996, Vol. 124, no.11. (with K. Subramaniam and J. Popovics)
- “The Effect of Specimen Thickness on Fracture Behavior of Concrete,” *Magazine of Concrete Research*, June 1996, Vol. 48, No. 75, pp. 117-129. (with E. Wollrab, C. Ouyang, J. Hamm and G. König)
- “Post-Peak Behavior of Laterally Reinforced Concrete Panels in Compression-Tension,” *ACI Materials Journal*, November/December 1996, pp. 685-695. (with K. Thienel)
- “Response of Reinforced Concrete Panels Under Uniaxial Tension,” *ACI Structural Journal*, November/December 1996, pp. 648-657. (with E. Wollrab, S.M. Kulkarni and C. Ouyang)
- “Mechanical Properties of PVA Fiber-Reinforced Cement Composites Fabricated by Extrusion Processing,” accepted for publication in *ACI Materials Journal*, August 1996. (with Y. Shao)

1995

- “Fiber-Matrix Interaction in Microfiber-Reinforced Mortar,” *Advanced Cement Based Materials*, 1995, vol. 2, No. 2, pp. 53-61. (with L.R. Betterman and C. Ouyang)
- “Evaluation of Damage in Brazilian Test Using Holographic Interferometry,” *ACI Journal*, 1995, Vol. 92, No. 5, pp. 268-275. (with A. Castro-Monteiro and Z. Jia)
- “Characterization of the Paste -Aggregate Interfacial Transition Zone Surface Roughness and Its Relationship to Fracture Toughness of Concrete,” *Journal of Materials Science*, 1995, Vol. 30, pp. 3149-31554. (with D. Zampini and H.M. Jennings, H.M.)
- “Stress Strain Results of Concrete from Circumferential Strain Feedback Control Testing,” *ACI Materials Journal*, July/August 1995, Vol. 92, No. 4, pp. 419-428. (with D. Jansen and E. Rossow)
- “Frequency-Dependent Stress Wave Attenuation in Cement-Based Materials,” *Journal of Engineering Mechanics*, June 1995, pp. 737-744. (with E. Landis)
- “The Influence of Microcracking on the Mechanical Behavior of Cement-Based Materials,” *Advanced Cement Based Materials*, May 1995, Vol. 2, No. 3, pp. 105-118. (with E. Landis)
- “Rate Effect on Interfacial Response between Fibers and Matrix,” *RILEM Journal of Materials and Structures*, 1995, Vol. 28, pp. 83-91. (with C. Ouyang and A. Pacios)

1994



- "Fracture Mechanics for Failure of Concrete," Annual Review of Materials Science, 1994, Vol. 24, pp. 293-320. (with C. Ouyang)
- "Pull-out of Inclined Fibers from a Cementitious Matrix," ASCE *Journal of Engineering Mechanics*, December 1994, Vol. 120, No. 12, pp. 2641-2659. (with C. Ouyang and A. Pacios)
- "Some Aspects of Closed-Loop Controlled Testing of Reinforced Concrete Beams at High Rates," *ACI Special Publication* (SP 143), pp. 123-144. (with S.M. Kulkarni)
- "A Fracture Energy Approach for Predicting Cracking of Reinforced Concrete Tensile Member," *ACI Structural Journal*, January/February, 1994 Vol. 1, No. 1., (with C. Ouyang)
- "Matrix Cracking and Interface Debonding in Fiber-Reinforced Cement-Matrix Composites," *Journal of Advanced Cement Based Materials*, 1994. Vol. II., (with Y. Shao and Z. Li)
- "Relationship Between Microstructure and Mechanical Properties of the Paste-Aggregate Interface," *ACI Materials Journal*, January/February 1994. Vol. 91, No. 1, pp. 30-39, (with K. Mitsui, Z. Li, and D.A. Lange)
- "Two-Dimensional Electronic Speckle Interferometry and concrete Fracture Processes," *Experimental Mechanics*, 1994, Vol. 34, No. 3, pp. 262-270.
- "Localization of Microcracking in Concrete Under Uniaxial Tension," *ACI Materials Journal*, July/August 1994 Vol. 91, No. 4, , pp. . (with Z. Li)

1993

- "New Test Method for Obtaining Softening Response of Unnotched Concrete Specimen Under Uniaxial Tension," *Experimental Mechanics*, September 1993, pp. 181-188. (with Z. Li and S.M. Kulkarni)
- "Analysis of Surface Roughness Using Confocal Microscopy," *Journal of Materials Science*, Vol. 28, 1993, pp. 3879-3884. (with D.A. Lange and H.M. Jennings)
- "Effects of Clays on Fracture Properties of Cement-Based Materials," *Cement and Concrete Research*, Vol. 23, 1993, pp. 711-723. (with M. Moukwa, B.G. Lewis and C. Ouyang)
- "Image Analysis Techniques for Characterization of Pore Structure of Cement-Based Materials," *Cement and Concrete Research*, 1993, in press. (with D.A. Lange and H.M. Jennings)
- "Micromechanical Analysis of Multiple Fracture and Evaluation of Debonding Behavior for Fiber Reinforced Composites," *International Journal of Solids and Structures*, Vol. 31, No. 11, 1993, pp. 1429-1459. (with S.H. Li, Z. Li, and T. Mura)
- "New Test Method for Obtaining Softening Response of Unnotched Concrete Specimens Under Uniaxial Tension," *Experimental Mechanics*, Vol. 33, September 1993, pp. 181-188. (with Z. Li and S.M. Kulkarni)
- "Recovery of Microcrack Parameter in Mortar Using Quantitative Acoustic Emission," *Journal of Nondestructive Evaluation*, 1993, in press. (with E. Landis)
- "Relationship Between Fracture Surface Roughness and Fracture Behavior of Cement Paste and Mortar," *Journal of the American Ceramic Society*, Vol. 76, No. 3, March, 1993, pp. 589-597. (with D.A. Lange and H.M. Jennings)
- "Shrinkage Cracking and Durability Characteristics of Cellulose Fiber," *ACI Materials Journal*, Vol. 90, No.4, 1993, pp. 309-318. (with M. Sarigaphuti and K.D. Vinson)
- "Toughening Mechanisms in Quasi-Brittle Materials," *Journal of Materials and Technologies*, ASME, Vol. 115, July 1993, pp. 300-306. (with C. Ouyang)

1992

- "Automated Determination of First P-wave Arrival and Acoustic Emission Source Location," *Journal of Acoustic Emission*, Vol. 10, No. 1-2, 1991-1992, pp. S97-S103. (with E. Landis and C. Ouyang)
- "The Effects of Shrinkage Reducing Admixtures on Restrained Shrinkage Cracking of Concrete," *ACI Materials Journal*, Vol. 89, No. 3, 1992, pp. 289-295. (with M. E. Karaguler and M. Sarigaphuti)
- "Fracture Mechanics and Size Effects of Concrete Strength in Tension," *Journal of Structural Engineering*, ASCE, Vol. 18, No. 11, 1992, pp. 3169-3185. (with T. Tang and C. Ouyang).
- "Toughening of High Strength Cementitious Matrix Reinforced by Discontinuous Short Fibers," *Cement and Concrete Research*, Vol. 22, NO. 6, 1992, pp. 1201-1215. (with C. Ouyang)

1991

- "Characterization of Interfacial Properties in Fiber Reinforced Cementitious Composites," *Journal of American Concrete Society*, Vol. 74, pp. 2156-2164, 1991. (with Z. Li and B. Mobasher) "Cohesive Crack Models for Cement Mortar Examined Using Finite Element Analysis and Laser Holographic Measurements," *Journal of the American Ceramic Society* Vol. 74, pp. 130-138, 1991. (with R. Miller and A. Castro-Montero)
- "Damage Assessment in Concrete Using Quantitative Acoustic Emission Techniques," *Journal of Engineering Mechanics*, Vol. 117, No. 11, pp. 2681-2698 1991. (with C. Ouyang and E. Landis)
- "Determination of Fracture Parameters  $K_{SIc}$  and  $CTODc$  of Plain Concrete Using Three-Point Bend Tests," *Materials and Structures*, 1991, Vol. 23, pp. 457-460.
- "Do Fibers Increase the Tensile Strength of Cement-Based Matrixes?," *ACI Materials Journal*, pp. 595602, November/December, 1991.
- "Features of Mechanics of Quasi-Brittle Crack Propagation in Concrete," *International Journal of Fracture*, Vol. 51, pp. 103-120, 1991. (with Y.S. Jenq)
- "Fracture Toughness of Fiber Reinforced Concrete," *ACI Materials Journal*, Vol. 88, No. 4, pp. 339-353, 1991. (with V. S. Gopalaratnam, G. Batson, M. Criswell, V. Ramakrishman and M. Wecharatana).
- "Geometry Dependent R-Curve for Quasi-Brittle Materials," *Journal of the American Ceramic Society*, Vol. 74, No. 11, pp. 2831-2836, 1991. (with C. Ouyang)
- "Influence of the Hydration Process Upon Microwave Properties of Cements," *Cement and Concrete Research*, Vol. 21, pp. 863-872, 1991. (with M. Moukwa, M. Brodwin, S. Christo and J. Chang)
- "Modeling of Fiber Toughening in Cementitious Materials Using an R-Curve Approach," *International Journal of Fracture*, No 26, 50:199 - 219, 1991. (with B. Mobasher and C. Ouyang)
- "Micromechanical Theory and Uniaxial Tensile Tests of Fiber Reinforced Cement Composites," *Journal of Materials Research*, Vol. 6, pp. 2463-2473, 1991.
- "Mixed Mode Crack Propagation in Quasi-Brittle Materials," *Engineering Fracture Mechanics*, Vol. 38, No. 2/3, pp. 129-145, 1991. (with M. A. Tasdemir and A. K. Maji)
- "Multiple Fracture of Fiber Reinforced Brittle Matrix Composites Based on Micromechanics," accepted for publication in *Engineering Fracture Mechanics*, September 18, 1991. (with S.H. Li, Z. Li, and T. Mura)
- "Toughening of High Strength Cementitious Matrix Reinforced by Discontinuous Short Fibers," accepted for publication in *Cement and Concrete Research*, September 1991. (with C. Ouyang)
- "Mechanical Behavior of Fiber-Reinforced Cement-Based Composites," *Journal of the American Ceramic Society*, November 1991, vol. 74, no. 11, pp. 2727-2738, 2947-2953. (with C. Ouyang)

1990

- “A Study of Fracture in Fiber Reinforced Cement-Based Composites Using Laser Holographic Interferometry,” *Journal of Experimental Mechanics*, Vol. 30, 1990. (with B. Mobasher and A. Castro)
- “An R-Curve Approach for Fracture of Quasi-Brittle Materials,” *Engineering Fracture Mechanics*, Vol. 37, No. 4, 1990. (with C. Ouyang and B. Mobasher)
- “Crack Propagation of Concrete Under Compression,” *Journal of Engineering Mechanics*, May 1990. (with M. A. Tasdemir and A. K. Maji)
- “Dynamic Response of Shallow-Buried Cylindrical Structures,” *Journal of Engineering Mechanics*, Vol. 116, No. 1, Jan. 1990, ASCE. (with H.L. Chen and L.M. Keer)
- “Fracture Mechanism of Quasi-Brittle Materials Based on Acoustic Emission,” *Journal of Materials Research*, Vol. 5, No. 1, January 1990. (with C. Ouyang and A. Maji)
- “Fracture Toughness of High Strength Concrete,” *Journal*, ACI, May-June 1990.
- “Interaction Between Fibers and Cement Matrix in Glass Fiber Reinforced Concrete,” ACI Special Volume, SP-124, 1990. (with B. Mobasher)
- “Measurement of Mixed-Mode Crack Profiles by Holographic Interferometry,” *Experimental Mechanics*, June, 1990. (with A. Maji)
- “Microcracking in Fiber Reinforced Concrete,” *Journal of Cement and Concrete*, Vol. 20, 1990. (with B. Mobasher and H. Stang)
- “Mixed Mode Fracture of Concrete Subjected to Impact Loading,” *Journal of Structural Engineering*, Vol. 116, No. 3, March 1990.
- “Properties and Application of Fiber Reinforced Concrete,” a chapter in the *Encyclopedia of Composites*, 1990.
- “Quantitative Damage Characterization in Polypropylene Fiber Reinforced Concrete,” *Journal of Cement and Concrete*, Vol. 20, 1990. (with H. Stang and B. Mobasher)
- “Shrinkage Cracking of Fiber Reinforced Concrete,” *ACI Materials Journal*, Vol. 87, No. 2, March-April 1990. (with M. Grzyboski)
- “Tests of Model Reinforced Concrete Circular Slabs,” *ACI Structural Journal*, Vol. 87, No. 6, November/December 1990. (with Y. J. Chen, H. L. Chen, A. N. Dancygier and L. M. Keer)
- “Strain Field Measurement in Fracture Process Zone,” *Journal of Engineering Mechanics*, Nov. 1990. (with A. Castro and R. Miller)
- “The Pull-Out Problem: The Stress Versus Fracture Mechanical Approach,” *Journal of Engineering Mechanics*, Oct. 1990. (with H. Stang and Z. Li)
- “Ductility of Ferrocement Beams,” *Journal of Ferrocement*, Vol. 20, No. 4, October 1990, pp. 349-355. (with P. Balaguru and R. K. Narahari)

1989

- “Test Parameters to Evaluate Toughness of GFRC Panels,” *ACI Journal*, Vol. 86, No. 5, September/October, 1989 (with B. Mobasher).
- “A Model to Predict Shrinkage Cracking in Fiber Reinforced Concrete,” *Magazine of Concrete Research*, Vol. 41, No. 148, 1989. (with M. Grzyboski)

- “Application of Acoustic Emission and Laser Holography to Study Microstructure in Concrete,” *ACI Special Publication*, SP-112, 1989. (with A. Maji)
- “Effect of Loading Rate on Model Beam-Column Joint and Anchorage Bond Specimen,” *ACI Journal*, Vol. 86, April 1989. (with L. Chung)
- “Mode I Fracture in Concrete Using Center Cracked Plate Specimens,” *Journal of Engineering Mechanics*, February 1989. (with M. Alvarado and R. John)
- “Fracture Mechanics Analysis of High Strength Concrete,” *Journal of Civil Engineering Materials*, Vol. 1, No. 4, November 1989. (with R. John)
- “Measurement and Description of the Failure Processes in Rock,” *Journal of Engineering Mechanics*, ASCE, Vol. 115, No. 9, September 2, 1989, pp. 1935-1949. (with J. Labuz and C. Dowding)
- “Shear Resistance of Reinforced Concrete Beams,” Accepted for publication, *ACI Special Publication*, SP-118, 1989. (with Y. S. Jenq)

1988

- “Analysis of the Debonding and Pullout Process in Fiber Composites,” *Journal of Engineering Mechanics*, ASCE, February 1988. (with Morrison and Y.S. Jenq)
- “Crack Profiles in Mortar Measured by Laser Holographic Interferometry,” *Experimental Mechanics*, December 1988. (with R. A. Miller and H.I. Bjellknagen)
- “Fracture Toughness of Cement Based Materials,” *Materials and Structures*, March 1988.
- “Low Velocity Impact of an Elastic Plate Resting on Sand,” *Journal of Applied Mechanics*, December 1988, Vol. 110. (with H.L. Chen and L.M. Keer)
- “Mixed Mode Fracture of Concrete,” *International Journal of Fracture*, Vol. 38, 123-142, 1988. (with Y.S. Jenq)
- “Parametric Study of Acoustic Emission Location Using Only Four Sensors,” *International Journal of Rock Mechanics and Rock Engineering*, 21, 1988, pp. 139-148. (with J. Labuz, H.S. Chang and C. Dowding)
- “Process Zone and Acoustic Emission Measurement in Concrete,” *Experimental Mechanics*, March 1, 1988. (with A. Maji)
- “Test of Model Masonry Single Pier under Dynamic Shaking and Quasistatic Cyclic Loading,” Proceedings, ASTM Symposium on Masonry, ASTM STP-992, 1988. (with H.L. Chen)
- “Theoretical Models for Redirecting the Performance of Fiber Reinforced Concrete,” *Journal of Ferrocement*, Vol. 18, No. 3, July 1988, pp. 263-284.
- “Toughness Durability of Glass Fiber Reinforced Concrete Systems,” *Journal*, American Concrete Institute, September/October 1988, Vol. 85, No. 5. (with D. Ludirdja, J.I. Daniel and B. Mobasher) 1987
- “A Constitutive Model for Shear Transfer in Cracked Concrete,” *Journal of Structural Engineering*, ASCE, May 1987, Vol. 113, No. 5. (with Divakker and A. Fafitis)
- “A Fracture Mechanics Model to Predict the Rate Sensitivity of Mode I Fracture in Concrete,” *Cement and Concrete Research*, March 1987, Vol. 17, No. 2. (with R. John and Y.S. Jenq)
- “An Analytical Model for the Pullout of Rigid Anchors,” *International Journal of Fracture*, Vol. 33, 1987. (with R. Ballarini and L.M. Keer)
- “Early-Age Bond Strength in Reinforced Concrete,” *ACI Journal*, November 1987. (with R. Chapman)

- “Internal Cracking and Strain Softening Response of Concrete under Uniaxial Compression,” *Journal, ACI*, May 1987. (with R. Sankar)
- “Model Concrete Beam-Column Joints Subjected to Cyclic Loading at Two Rates,” *Materials and Structures*, March 1987, Vol. 20, No. 116. (with K. Wang and L. Chung)
- “Reinforced Concrete Hysteretic Model Based on Damage Concept,” *Journal of Earthquake Engineering and Structural Dynamics*, Vol. 55, pp. 993-1003, November 1987. (with K. Wang)
- “Restrained Shrinkage Test with Fiber Reinforced Concrete,” *ACI Special Publication*, SP-105, December 1987. (with H. Krenchel)
- “Tensile Fracture of Steel Fiber Reinforced Concrete,” *Journal of Engineering Mechanics Division*, ASCE, Vol. 113, May 1987. (with V.S. Gopolaratnam)
- “The Fracture Process Zone in Charcoal and Rockville Granite: Evidence and Effect,” *International Journal of Rock Mechanics and Mining Science*, August 1987. (with C. Dowding and J. Labuz)
- “Toughness of Glass Fiber Reinforced Concrete Panels,” *Journal of Prestressed Concrete Institute*, October 1987. (with D. Ludirdja and J.I. Daniel)
- “Using Seismic Techniques to Characterize Fracture in Rock,” *Experimental Techniques*, March 1987, pp. 30-32. (with J. Labuz and C. H. Dowding)

1986

- “A Constitutive Model for Biaxial Cyclic Loading of Concrete,” *Journal of Engineering Mechanics*, ASCE, Vol. 112, pp. 760-775 August 1986. (with A. Fafitis)
- “A Study of Reinforced Concrete Strength at Early Ages,” *ACI Special Publication*, SP-95, 1986. (with R.A. Miller and T. Virding)
- “Behavior of Hoop Confined Concrete under High Strain Rate,” *ACI Journal*, February 1986. (with S. Ahmad)
- “Crack Propagation Resistance of Fiber Reinforced Concrete,” *Journal of Structural Engineering*, ASCE, Vol. 112, pp. 19-34, January 1986. (with Y.S. Jenq)
- “Failure Characteristics of Short Anchor Bolts Embedded in a Brittle Material,” *Proceedings of the Royal Society*, London 1986. (with R. Ballarini and L.M. Keer)
- “Failure of Fiber Reinforced Composites by Pull-Out Fracture,” *Journal of Materials Science*, March 1986. (with H. Stang)
- “Fracture Analysis of the Pullout Test,” *Materials and Structures*, January 1986. (with H. Krenchel)
- “Fracture of Concrete Subjected to Impact Loading,” *Journal of Cement, Concrete and Aggregates*, ASTM, Summer 1986. (with R. John)
- “Orthotropic Model of Concrete for Triaxial Stresses,” *Journal of Structural Engineering*, ASCE, Vol. 112, No. 1, January 1986 pp. 165-181. (with S. Ahmad and B. Karihaloo)
- “Properties of Steel Fiber Reinforced Concrete Subjected to Impact Loading,” *Journal ACI*, Vol. 83, January 1986. (with V.S. Gopalratnam)
- “Structural Properties of High Strength Concrete,” *Journal of Prestressed Concrete Institute*, Vol. 30, pp. 92-119, Jan. 1986. (with S. Ahmad)

1985

- “A Constitutive Model for Concrete under Dynamic Loading,” *Journal of Structural Engineering*, ASCE, March 1985. (with W. Suaris)
- “A Fracture Toughness Criteria for Concrete,” *Engineering Fracture Mechanics*, Vol. 21, No. 5, pp. 1055-1069, 1985. (with Y.S. Jenq)
- “A Two Parameter Fracture Model for Concrete,” *Journal of Engineering Mechanics*, ASCE, October 1985. (with Y.S. Jenq)
- “Alternative Reinforcing Materials for Less Developed Countries,” *International Journal for Development Technology*, June 1985. (with P. Balaguru)
- “Applications of Polypropylene Fibers in Scandinavia,” *Concrete International*, March 1985. (with H. Krenchel)
- “Experimental Analysis of Crack Propagation in Granite,” *International Journal of Rock Mechanics and Mining Science*, Vol. 22, pp. 85-89, April 1985. (with J. Labuz and C. Dowding)
- “Lateral Reinforcement for High Strength Concrete Columns,” *ACI Special Publication*, SP-87, December 1985. (with A. Fafitis)
- “Lateral Reinforcement for High Strength Concrete Columns,” *ACI Special Publication*, SP-87-12, 1985. (with A. Fafitis)
- “Predictions of Ultimate Behavior of Confined Columns Subjected to Large Deformations,” *ACI Journal*, Vol. 82, July 1985. (with A. Fafitis)
- “Softening Response of Plain Concrete in Direct Tension,” *ACI Journal*, May 1985. (with V.S. Gopalaratnam)

1984

- “A Modified Instrumented Charpy Test for Cement Composites,” *Experimental Mechanics*, June 1984. (with V.S. Gopalaratnam and R. John)
- “A Rate Sensitive Damage Theory for Brittle Solids,” *Journal of Engineering Mechanics*, ASCE, June 1984. (with W. Suaris)
- “A Rheological Stochastic Model for Cyclic Loading of Concrete,” *Journal of Structural Engineering*, ASCE, September 1984. (with A. Fafitis)
- “A Study of the Transfer of Tensile Forced by Bond,” *ACI Journal*, May 1984. (with D. Jiang and Andonian)
- “Crack Growth in Cement Based Composites,” *Engineering Fracture Mechanics*, Vol. 20, No.3, pp 433-445, 1984 (with R. Ballarini and L.M. Keer)
- “Prediction of Cumulative Damage for Concrete and Reinforced Concrete,” *RILEM Journal of Materials and Structures*, Vol. 17, No. 37, 1984.
- “Prediction of Tensile Response of Ferrocement,” *Journal of Ferrocement*, Vol. 14, No. 2, April 1984. (with S. Somayaji)

1983

- “A Model for Predicting Fracture Resistance of Fiber Reinforced Concrete,” *Cement and Concrete Research*, November 1983. (with M. Wecharatana)
- “Cyclic Loading of Spirally Reinforced Concrete,” *Journal, Structural Division*, ASCE, Vol. 109, No. ST7, July 1983. (with A. Fafitis and R. Arnold)

“Envelope Curves for Confined Concrete Subjected to Cyclic Loading,” *Journal*, Structural Division, ASCE, July 1983. (with A. Fafitis and R. Arnold)

“Predictions of Nonlinear Fracture Process Zone in Concrete,” *Journal of Engineering Mechanics Division*, ASCE, October 1983. (with M. Wecharatana)

“Properties of Concrete and Fiber Reinforced Concrete Subjected to Impact Loading,” *Journal*, Structural Division, ASCE, July 1983. (with W. Suaris)

“Some Development in Polypropylene Fibers in Concrete,” *ACI Special Volume on Fiber Reinforced Concrete*, SP-81, 1983. (with A. Naaman and Throne)

“Test Methods for Impact Resistance of Fiber Reinforced Concrete,” *ACI Special Volume on Fiber Reinforced Concrete*, SP-81, 1983. (with W. Sauris)

1982

“Analysis of Inertial Effects in the Instrumented Impact Testing of Cement Composites,” *ASTM Journal of Cement, Concrete and Aggregates*, Vol. 3, No. 2, 1982. (with W. Suaris)

“A Method of Predicting Crack Widths and Deflections for Fatigue Loading,” *ACI Special Volume*, SP75, 1982. (with P. Balaguru)

“Complete Triaxial Stress-Strain Curves of Concrete,” *Journal*, Structural Division, ASCE, April 1982. (with S. Ahmad)

“Predictions of Nonlinear Fracture Process Zone in Concrete,” *Journal*, Structural Division, ASCE, June 1982. (with M. Wecharatana)

“Recent Developments in Ferrocement,” *RILEM Journal of Materials and Structures*, August 1982.

“Resistance to Crack Growth in Portland Cement Composites,” *Journal*, Structural Division, ASCE, June 1982. (with M. Wecharatana)

“Strain Rate Effects in Fiber Reinforced Concrete,” *Journal*, Composites, April 1982. (with W. Suaris)

“Stress-Strain Curves for Confined Concrete,” December 1982, *Journal*, ACI. (with S. Ahmad)

1981

“An Experimental Technique for Obtaining Complete Stress-Strain Curves for High Strength Concrete,” *Cement, Concrete and Aggregates*, ASTM, Vol. 3, No. 1, 1981. (with V. Gokoz and F. Ansari)

“Bond Stress vs. Slip Relationship and Cracking Response of Tension Members,” *Journal*, ACI, May/June 1981. (with S. Somayaji)

“High Strength Concrete—A Workshop Summary,” *Concrete International*, ACI, May 1981.

1980

“Double Torsion Tests for Studying Slow Crack Growth,” *Cement and Concrete Research*, Vol. 10, November 1980. (with M. Wecharatana)

“Fracture Behavior and Analysis of Fiber Reinforced Concrete,” *Cement and Concrete Research*, January 1980. (with G. Velazco and K. Visalvanich)

“Static and Fatigue Properties of Concrete Beams Reinforced with Continuous Bond and Fibers,” *Journal*, ACI, January/February 1980. (with H. Kormeling and H. Reinhardt)

1979

- “Behavior and Design of Ferrocement Subjected to Fatigue Loading,” *Journal*, Structural Division, ASCE, 1979. (with P. Balaguru and A. Naaman)
- “Serviceability of Ferrocement Subjected to Flexural Fatigue,” *International Journal of Cement Composites*, July 1979. (with P. Balaguru and A. Naaman)
- “Tentative Recommendation for the Construction of Ferrocement Tanks,” *ACI Special Volume*, SP-61, 1979.
- 1978
- “Crack Control in Ferrocement and Its Comparison with Reinforced Concrete,” *Journal*, ACI, November 1978. (with K. Wang and A. Naaman)
- “Ferrocement Cylindrical Shells Subjected to Internal Pressure,” *Journal*, ACI, January 1978. (with A. Guerra and A. Naaman)
- “High Strength Concrete in Ultimate Strength Design,” *Journal*, Structural Division, ASCE, November 1978. (with K. Wang and A. Naaman)
- “Investigations on Concrete Impregnated with Sulfur,” *ACI Special Volume*, SP-58, 1978. (with R. Smith and A. Naaman)
- “Stress-Strain Curve of Normal and Lightweight Concrete in Compression,” *Journal*, ACI, November 1978. (with K. Wang and A. Naaman)
- 1977
- “Analysis and Behavior of Ferrocement in Flexure,” *Journal*, Structural Division, ASCE, October 1977. (with P. Balaguru and A. Naaman)
- “Properties of Glass Fiber Reinforced Gypsum Sheets,” *Journal*, Structural Division, ASCE, January 1977. (with D. Baehr)
- 1976
- “Mechanical Properties of Steel and Glass Fiber Reinforced Concrete,” *Journal*, ACI, January 1976. (with A. Naaman)
- “Pull-Out Mechanism in Steel Fiber Reinforced Concrete,” *Journal*, Structural Division, ASCE, August 1976. (with A. Naaman)
- “Use of Expanded Metal Lathe in Reinforced Concrete,” *Journal*, ACI, February 1976 (with J. Hanson and T. Harmon).
- 1975
- “A Model of Concrete Subjected to Triaxial Stresses,” *Journal*, Cement and Concrete Research, July 1975. (with R. Palaniswamy)
- “Properties and Possible Uses of Waste Slurry from Ready-Mix Concrete,” *Journal*, Cement and Concrete Research, May 1975. (with M. Pistilli and C. Peterson)
- 1974
- “An Integrated Interdisciplinary Course in Housing,” *Journal*, ASCE, February 1974. (with T. Mulcahy)
- “Flexural Strength of Ferrocement,” *Journal*, ACI, January 1974. (with D. Logan)
- “Fracture and Stress-Strain Curve of Concrete Subjected to Triaxial Stresses,” *Journal*, Structural Division, ASCE, May 1974. (with R. Palaniswamy)



“New Reinforcing Materials in Concrete Construction,” *Journal*, ACI, May 1974.

1973

“Moment Capacity and Cracking Behavior of Ferrocement in Flexure, *ACI Journal*, December 1973 (with D. Logan).

1972

“Impact Resistance of Ferrocement,” *Journal*, Structural Division, ASCE, January 1972. (with W. Key)

“Polymer Latex Modified Mortars,” *Journal*, ACI, January 1972. (with S. Yannas)

“Strength of Lightweight Aggregates,” *Journal of Materials*, ASTM, September 1972. (with C. Ramos)

1971

“Fiber Reinforced Concrete Properties,” *Journal*, ACI, Proceedings, Vol. 68, No. 2, February 1971. (with B. V. Rangan)

“Tensile Strength of Ferrocement,” *Journal*, ACI, September 1971. (with A. Naaman)

“Testing Methods for Concrete Durability,” *RILEM Journal of Materials and Structures*, No. 3, Vol. 4, September 1971. (with O. Gjorv)

“Griffith Fracture Criterion and Concrete,” *Journal of the Engineering Mechanics Division*, ASCE, Vol. 97, No. EM6, December 1971. pp. 1663-1674 (with F.J. McGarry)

1970

“Fracture of Concrete Subjected to Cyclic and Sustained Loading,” *Journal*, ACI, Proc. Vol. 67, No. 10, October 1970. (with S. Chandra)

“Mechanical Behavior of Concrete Examined by Ultrasonic Measurement,” *Journal of Materials*, ASTM, Vol. 5, No. 3, September 1970. (with S. Chandra)

“Effects of Reinforcements on Ductility of Concrete,” *Journal of Structural Division*, ASCE, Vol. 96, No. ST6, June 1970. pp. 1167-1184 (with B.V. Rangan)

1969

“Some Micromechanical Properties of Fiber Reinforced Concrete,” *MIT Department of Civil Engineering*, December 1, 1969. (with R.V. Rangan)

1968

“Critical Stress, Volume Change and Microcracking of Concrete,” *Journal*, ACI, Proc. Vol. 65, No. 9, September 1968. (with S. Chandra)

1966

“Inelastic Behavior and Fracture of Concrete,” *Journal*, ACI, Proc, Vol. 63, No. 9, September 1966. (with G. Winter)

1965

“Effects of Flexural Strain Gradients on Microcracking and Stress-Strain Behavior of Concrete,” *Journal*, ACI, Proc. Vol. 62, No. 7, July 1965. (with G. Sturman and G. Winter)

“Ductility of Concrete Reinforced with Stirrups, Fibers and Compression Reinforcement,” *Journal*, Structural Division, ASCE, Vol. 96, No. ST6.

## **Books**

- S.P. Shah, S.E. Swartz and C. Ouyang, *Fracture Mechanics of Concrete*, John Wiley & Sons, 1995.
- S.P. Shah and S.H. Ahmad, *High Performance Concrete and Applications*, Edward Arnold, 1994.
- P. Balaguru and S.P. Shah, *Fiber Reinforced Cement Composites*, McGraw Hill, 1992.

## **Patents**

- SP Shah, MS Konsta-Gdoutos and ZS Metaxa. “Highly dispersed carbon nanotube reinforced cement based materials” United States Patent Application US2009229494 (A1) — 2009-09-17
- Hersam; Mark C., Seo; Jung-Woo T. , Shah; Surendra P. , Konsta-Gdoutos; Maria S., Metaxa; Zoi S. . Highly concentrated nano-reinforcement suspensions for cementitious materials and method of reinforcing such materials. United States Patent, US8,865,107(B2)- 2014-10-14
- Shah; Surendra P., Shao; Yixin, Marikunte; Shashi. Method of making extruded fiber reinforced cement matrix composites. United States Patent, US5,891,374 (B2)- 1999-04-06
- Shah; Surendra P., Shao; Yixin, Marikunte; Shashi. Extruded fiber reinforced cement matrix composites and method of making same. United States Patent, US6,528,151 (B2)- 2003-03-04<sup>[SEP]</sup>

## **RESEARCH AWARDS**

- Carbon Nano Tube Reinforced Cement Based Materials, CEMEX,(with David Corr and Maria Konsta)
- Increasing Use of Fly Ash in Concrete through Nanomaterial Modification, Multiscale Characterization, and Improved Processing*, Tennessee Valley Authority (with K. Wang)
- Design and Application of High-Volume Fly Ash Self-Consolidating Concrete with the Incorporation of Nanoparticles*, Infrastructure Technology Institute, Northwestern University
- Crack Free Concrete Made with Nanofiber Reinforcement*, Infrastructure Technology Institute, Northwestern University
- Collaborative Research: Measuring, Monitoring, and Modeling the Setting Properties of Concrete*, National Science Foundation (with Z. Sun)
- Chemically Bonded Phosphates*, Institute of Tribology and Coatings
- SCC Formwork Pressure*, Ready Mixed Concrete Research Foundation and American Concrete Institute-Concrete Research and Education Foundation (with K. Khayat)
- Thixotropy and Formwork Pressure of SCC*, National Science Foundation
- Design and Application of Low Compaction Energy Concrete for Use in Slip-Form Concrete Paving*, Infrastructure Technology Institute
- Highways 2008*, Federal Highway Administration
- Self-Consolidating Concrete—Applications for Slip Form Paving*, Iowa State University

*Sensing Intrinsic Nano-Microstructural Characteristics of Hardening Concrete with High-Frequency Transverse Waves*, National Science Foundation

*Collaborative Research: Theoretical, Experimental, and Stochastic Multi-Scale Analysis of Concrete*, National Science Foundation (With L. Graham-Brady)

*Clinker-Free Concrete Made with Illinois Class F Fly Ash*, Illinois Clean Coal Institute

*Ultrasonic Technique for Monitoring the Setting and Hardening of Concrete*, Infrastructure Technology Institute, Northwestern University

*Development of Non-Clink Cement for Environmental Hazard Reduction*, National Science Foundation

*Hybrid Fiber Reinforced Composites*, Center for Advanced Cement-Based Materials

*CKD-Slag Blended Cements*, Center for Advanced Cement-Based Materials

*Extruded Fiber Reinforced Concrete Panels for Residential Construction*, National Science Foundation

*Effect of Pressure on Manufactured Cement Board*, Saint-Gobain

*Concrete Reinforced with Cellulose Fibers*, Weyerhaeuser

*Rheology of Cement Matrix for Self-Compacting Concrete*, Center for Advanced Cement-Based Materials

*Durability of Glass Fiber Reinforced Cement-Based Composites*, Nippon Electric Glass Fibers, America

*Ultrafine Fly Ash*, Boral Materials Technology

*High Performance, Non Corroding Steel Reinforced Concrete*, NSF-SBIR

*Injection System Pilot Study*, Hilti Entwicklungsgesellschaft mbH

*Instrumentation and Laboratory Improvement*, National Science Foundation

*Extruded Fiber Reinforced Cement Composites*, Illinois Clean Coal Institut

*General Wall System Specification*, Butler Mfg. Co. Research Center

*ACBM-Howard Joint Research Collaboration*, National Science Foundation

*Studies of Fracture Processes with Computer Vision and Microtomography*, Air Force Office of Scientific Research

*Constitutive Modeling of Concrete*, FAA Center of Excellence for Airport Pavement, University of Illinois

*Microstructure, Transport Property and Statistical Science*, National Institute of Statistical Sciences

*Stonecraft, Incorporated*, General Research

*Improved Condition Monitoring for Bridge Management*, Infrastructure Technology Institute

*Concrete Research Needs Symposium*, ITT

*Immobilization of Waste in Grout-Main*, Westinghouse Hanford

*The Faculty Enhancement Program*, National Science Foundation

*Simplified Boiling Water Reactor Project*, Department of Energy

*Strain Softening Response of High Strength Concrete*, National Science Foundation

*Rate of Loading Dependency of Reinforced Concrete*, National Science Foundation - Pennsylvania State

*Characterization of Fracture Using Acoustic Emission*, AFOSR

*Removing Barriers to the Increased Use of High Strength Concrete, State of Illinois* (with E. Rossow, F. Young and R. Burg)

*NATO-ARW on Toughening Mechanism of Quasi-Brittle Materials*, State of Illinois Challenge Grant, Illinois Business Partnership Program

*Innovative Infrastructure*, Department of Education (with C. H. Dowding)

*Reinforcement of Concrete with Cellulose Fibers*, Proctor & Gamble

*A Study of Fracture Processes in Concrete Using Laser Holography*, AFOSR

*Mixed-Mode Fracture of Concrete at High Strain Rate*, AFES

*Shrinkage Reducing Admixture*, ARCO Chemical

*Center for Science and Technology of Advanced Cement-Based Materials (ACBM)*, National Science Foundation (1989-2000); Industrial Consortia (2000-). The ACBM Center is a consortium of five institutions: Northwestern University, University of Illinois, University of Michigan, Purdue University, and the National Institute of Standards and Technology. Dr. Shah is the Principal Investigator (PI) and the Director of the Center

*Toughness Data in Specification of Fiber Reinforced Concrete*, National Science Foundation

*Modification of the Physico-Chemical Properties of Cement Paste*, AFOSR (with Barbara-Ann Lewis)

*Influence and Specimen Size Loading Configuration Loading Rate and Fiber Type in the Flexural Behavior of Fiber Reinforced Concrete*, Concrete Materials Research Council (with V. S. Gopalaratnam)

*Symposium on Bonding in Cementitious Materials*, AFOSR (with MRS)

*A System for Microscopic Image Analysis for Studying Fracture Toughness and Cement Composites*, NSF Equipment Grant

*High Rate, Closed-Loop Triaxial Testing System for Concrete, Rock and Soil*, DOD Equipment Grant

*Dynamic Response of Embedded Structures*, AFOSR (with L. M. Keer)

*Long-Term Ductility of Glass Fiber Reinforced Concrete Panels*, National Science Foundation

*Expansive Cement Induced Fracture and Activity Detection*, U. S. Army Corps of Engineers, Waterways Experiment Station (with C. H. Dowding)

*Symposium on Strain Rate Effects and Fracture in Cement Composites*, AFOSR (with Material Research Society)

Cooperative Research with Denmark Technical University, NATO

*Microstructure, Crack Initiation, Propagation and Localization in Concrete*, AFOSR

*U. S.-Sweden Joint Seminar on Steel Fiber Reinforced Concrete*, National Science Foundation

*NATO Advanced Research Workshop on Application of Fracture Mechanics to Cementitious Composites*, NATO

*Post-Peak Tensile Response of Concrete*, U. S. Bureau of Reclamation

*Effect of Grain Size, Strain Rate and Moisture in Rock*, National Science Foundation (with C. H. Dowding)

*Strain Rate Effects for Concrete and Fiber Reinforced Concrete*, ARO

*Cyclic Stress-Strain Curves of Confined Concrete*, National Science Foundation

*Fracture Process Zone and R-Curves for Cementitious Composites*, National Science Foundation

*Fracture Toughness of Fiber Reinforced Concrete*, AFOSR

*Nondestructive Testing of Concrete*, James Electronics

German Government Visiting Scientist Award (DAAD)

*Instrumented Impact Testing System*, University of Illinois Research Board

*Envelope Curves for Confined Concrete*, National Science Foundation

*Workshop on High Strength Concrete*, National Science Foundation

*Dynamic Properties of Fiber Reinforced Concrete Subjected to Impact Loading*, ARO (with A. Naaman)

*Fracture and Multiple Cracking of Fiber Reinforced Concrete*, NSF (with A. Naaman)

*Cooperative Research with Delft Technical University, NATO*

*Static and Dynamic Properties of Ferrocement, National Science Foundation (with A. Naaman)*

*Development of Joint Research with Indian Institute of Science, National Science Foundation*

*Materials for Housing Construction in Developing Countries, University of Illinois Research Board*

*Ferrocement Panels, University of Illinois Research Board*

*Triaxial Behavior of Concrete, National Science Foundation*

*Environmental Chamber for Concrete Research, Title VI Equipment Grant*

*Nature of Critical Load and the Effect on the Behavior of Concrete Structures, National Science Foundation*