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✓ BIOSKETCH

Dr. Oral Buyukozturk is a Professor of Civil and Environmental Engineering, and Director of the Laboratory for Infrastructure Science and Sustainability, at Massachusetts Institute of Technology (MIT). He received his Ph.D. degree in Structural Engineering from Cornell University in 1970. He joined MIT faculty in 1976. His early work prior to joining MIT involved design and safety analysis of nuclear power structures, and at Brown University, he pioneered development of non-linear finite elements for modeling of heterogeneous materials and structures. He was involved in the development of a major general purpose computer program for civil, mechanical, aerospace structures. His early research at MIT included design and analysis of major energy facilities such as nuclear energy and offshore oil production structures, and thermo-mechanical analysis of coal gasification vessels. His work at MIT has also included design and assessment of concrete structures, nuclear containment systems, earthquake engineering, interface fracture mechanics, and fiber-reinforced polymer (FRP) composites in structural rehabilitation. His current research interests, in the context of large-scale multi-team multi-disciplinary projects, include infrastructure sustainability, multiscale analysis and design of durable and energy efficient materials, intelligent structures and materials, innovative sensing and data analytics, structural health monitoring (SHM), and nondestructive testing (NDT). His recent work in these areas have led to ground-breaking developments and innovations in multiscale mechanical-chemical interaction processes in cementitious materials, and in novel computer vision techniques for structural sensing incorporating motion magnification. The overall integration of the effort is directed toward building quantitative sustainability from bottom-up contributing to establishment of a new paradigm in infrastructure engineering. He has published nearly 300 technical papers in refereed journals, edited books and conference proceedings, made more than 200 invited and keynote presentations around the world, and served in different capacities in over 20 technical committees. His awards include Golden Mirko Roš Medal of the Swiss Federal Research Laboratory for Materials Science and Technology; Fellow (non-resident) Royal Society of Edinburgh, Scotland's National Academy of Science and Letters; 2008 and 2011 ASNT National Faculty Fellowship Awards; Fellow, American Concrete Institute (ACI), and various Best Paper Awards jointly with his students.

✓ EDUCATION

Ph.D. & M.S. - Cornell University
M.S.C.E. - Istanbul Technical University

✓ **PROFESSIONAL EXPERIENCE**

- 1985 – **Professor**, Department of Civil and Environmental Engineering, MIT, Cambridge, MA
- 1980 – 1985 **Associate Professor with tenure**, Department of Civil and Environmental Engineering, MIT, Cambridge, MA
- 1976 – 1980 **Associate Professor without tenure**, Department of Civil and Environmental Engineering, MIT, Cambridge, MA
- 2006 – 2006 **Visiting Professor**, Istanbul Technical University, Istanbul, Turkey
- 2006 – 2006 **Visiting Professor**, Kultur University, Istanbul, Turkey
- 1999 – 1999 **Visiting Professor**, National University of Singapore, Singapore
- 1998 - 2000 **Visiting Professor**, Bogazici University, Istanbul, Turkey
- 1991 – 1991 **Visiting Professor**, ETH, Zurich, Switzerland
- 1985 – 1985 **Visiting Professor**, Technical University of Berlin, Berlin, Germany
- 1983 – 1983 **Visiting Professor**, Istanbul Technical University, Istanbul, Turkey
- 1973 – 1974 **Adjunct Associate Professor**, Division of Engineering, Brown University, Providence, RI
- 1972 – 1976 **Senior Research Engineer/Director of Structural Mechanics Group**, Marc Analysis Research Corporation, Providence, RI
- 1970 – 1972 **Research Engineer/Consultant**, United Engineers and Constructors, Philadelphia, PA
- 1967 – 1970 **Research Assistant**, Department of Structural Engineering, Cornell University, Ithaca, NY

✓ **GRANTS AND CONTRACTS AS A PI (SINCE 1994)**

Data Interferometry for Field Monitoring: Development and Applications in Structural and Crustal Systems (2017-2019), Oral Buyukozturk (PI) and Nafi Toksoz (Co-PI), Shell Global, \$1,310,000.00

Signature Project 1: Sustainability of Kuwait's Built Environment (2013-2017), Kuwait Foundation for the Advancement of Sciences, \$4,970,000.00

Motion Sensing Wi-Fi Sensor Networks, Continuous 3D Modeling and Prediction of Facility Responses to Disturbances (2011-2017), MIT Energy Initiative, Shell International Exploration & Production, Inc., \$8,000,000.00

Energy-Based Structural Analysis of Single Degree of Freedom Systems Using Shake Table Experiments (2017-2018); MISTI, Oral Buyukozturk (PI), \$29,000.00

Seismic Surveying with Laser Doppler Vibrometry (LDV) (2016-2017), MIT Energy Initiative, Shell International Exploration & Production, Inc., Oral Buyukozturk (PI), \$125,000.00

Development and Performance Assessment of Oil Well Cements prepared with Saudi Arabian Volcanic Ash: Durability and Sustainability (2017–2018), Oral Buyukozturk (PI), Saudi Aramco, Saudi Arabia, \$150,000.00

Energy Fellow – Justin Chen (2016-2017), MIT Energy Initiative, Shell International Exploration & Production, Inc., \$60,000.00

Fellowship for J. Chen (2015-2017), MIT Energy Initiative, Shell International Exploration & Production, Inc., \$60,000.00

In-situ Damage Assessment of Cultural Heritage through Chemical Imaging and Motion Magnification (2016 - 2017), CEE Cross-Disciplinary Seed Fund Proposal, Approved 1 academic year, PI's Oral Buyukozturk and Admir Masic, \$70,000.00

Shell (MITEI) Energy Fellow – Justin Chen (2012-2013), MIT Energy Initiative, Shell International Exploration & Production, Inc., \$59,999.96

Remote Detection of Damage in FRP-Retrofitted Concrete Structures using Acoustic-Laser Vibrometry (2011-2013), The American Society for Nondestructive Testing, Oral Buyukozturk (PI), \$14,993.06

Mentoring Kuwaiti Scholar (2010-2013), Kuwait Foundation for the Advancement of Sciences, Oral Buyukozturk (PI), \$5,000.00

A Robust Methodology for the Standoff Condition Assessment of FRP-Retrofitted Concrete Systems (2009-2013), NSF, Oral Buyukozturk (PI), \$254,999.0

De-Bonding in Bi-layer Material Systems under Moisture Effects: A Multi-Scale Fracture Approach (2009-2013), NSF, Oral Buyukozturk (PI), \$353,728.22

Travel Support for the U.S. Participants to Attend an International Workshop on Prevention of Total Collapse of Existing Structures (2007-2008), NSF, Oral Buyukozturk (PI), \$12,558.55

Moisture Affected De-Bonding in FRP Retrofitted Concrete Systems – An Interface Fracture Approach (2005-2009), NSF, Oral Buyukozturk (PI), \$262,560.35

ACC Funding for Non-Destructive Evaluation of FRP-confined Concrete using Microwave (2004-2005), Lincoln Laboratory, Oral Buyukozturk (PI), \$50000.00

ACC Funding for Non-Destructive Evaluation of FRP-confined Concrete using Microwave (2004-2006), Lincoln Laboratory, Oral Buyukozturk (PI), \$50000.00

Nondestructive Evaluation of FRP-Confined Concrete Using Microwave (2003-2008), NSF, Oral Buyukozturk (PI), \$300,308.00

A Novel Approach to Nondestructive Evaluation of FRP-Confined Concrete using Microwaves (2002-2003), NSF, Oral Buyukozturk (PI), \$99,314.15

Use of Advanced Composites in Maglev Guideway Systems, Center for Transportation and Logistics (2002-2003), U.S. Department of Transportation TSC, Oral Buyukozturk (PI), \$60,000.00

Failure Behavior of FRP Bonded Concrete Affected by Interface Fracture (2001-2005), NSF, Oral Buyukozturk (PI), \$250366.00

Monitoring Fatigue Crack Growth in Steel Bridges Using Acoustic Emission (AE) Technique (2/1/2001 - 6/30/2001), Center for Transportation and Logistics, Trans. Tech. Center, Inc., Oral Buyukozturk (PI), \$19,915.75

Innovative Undergraduate Teaching Methods (1999-2000), University of Illinois, Oral Buyukozturk (PI), \$25,000.00

Application of Composite Materials to Railroad Bridges (1/1/1999 - 12/31/1999), Center for Transportation and Logistics Trans. Tech. Center, Inc., Oral Buyukozturk (PI), \$62,560.24

Uses of Fiber Reinforced Plastic's (FRP) in repair and Strengthening of Railroad Bridges (1/1/1998 - 12/31/1998), Center for Transportation and Logistics, Trans. Tech. Center, Inc., Oral Buyukozturk (PI), \$39,522.68

Innovative Undergraduate Teaching Methods (1998-2000), University of Illinois, Oral Buyukozturk (PI), \$45,000.00

Analyzing Aging of DOE Facilities Exposed to Man-Made and Natural Environmental Factors (4/16/1998 - 9/30/1998), Bechtel BWXT Idaho, LLC (BBWI), Oral Buyukozturk (PI), \$83,884.00

Affiliated Research Program Task 3.60: Composites, Center for Transportation and Logistics (1/1/1997 - 12/31/1997), Association of American Railroads, Oral Buyukozturk (PI), \$35722.76

Integrity of Pre-Cracked Re-Enforced Concrete Retrofitted with Composite Laminates (1996-2000), NSF, Oral Buyukozturk (PI), \$239,936.00

Behavior of High Strength Concrete Composites Influenced by Interfacial Fracture Properties (1994-1997), NSF, Oral Buyukozturk (PI), \$246,655.00

✓ **PUBLICATIONS**

BOOKS AND BOOK CHAPTERS

Buyukozturk, O. et al. Finite Element Analysis of Reinforced Concrete, ISBN: 0-87262-307-6, ASCE Special Committee Publication, 546 pages, 1982.

Sacks, R. and Buyukozturk, O., *An Expert System for Design of Reinforced Concrete Structures*, Expert Systems in Engineering, ISBN: 0-387-19229-8, edited by D.T. Pham, IFS Publications/Springer-Verlag, 1988.

Buyukozturk, O. et al., *Mathematical Modeling of Creep and Shrinkage of Concrete*, ISBN: 0-47192057-6, edited by Z.P. Bazant, John Wiley & Sons, 1988. Chapter 3 Creep Analysis of Structures, pp.217-273. Chapter 4 Finite Element Analysis of Creep and Shrinkage, pp.275-310. Chapter 5 Probabilistic Models, pp.311-383, 1988

Fracture Mechanics of Concrete: Concepts Models and Determination of Material Properties, ISBN: 1-85166-869-1, Part 1 of *Fracture Mechanics of Concrete Structures*, Elsevier Applied Science Publication, Edited by Z.P. Bazant, pp. 3-140, 1992.

Buyukozturk, O., and Lee, K.M., *Interface Fracture Mechanics of Concrete Composites*, Chapter 1 of Part II *Material Models for Concrete Fractures*, ISBN: 1-85166-869-1, Elsevier Science Publisher, Essex, England, pp.145-223, 1992.

Buyukozturk, O., and Wecharatana, M., editors, *Interface Fracture and Bond*, ISBN: 95-77208, ACI SP-156, 1995.

Buyukozturk, O., "Fracture Mechanics Parameters Influencing the Mechanical Properties of Concrete Composites," *Advanced Technology for Design and Fabrication of Composite Materials and Structures*, Kluwer Academic Publishers, edited by George C. Sih, Alberto Carpinteni, pp. 319-331, 1995.

Buyukozturk, O. and Hearing, B., *Influences of Mortar-Aggregate Interface Fracture on Concrete Behaviour*, Chapter 4 in *Festschrift zum 60. Geburtstag von Professor Dr.-Ing. Manfred Specht*, ISBN: 3-540-63525-4, pp. 51-70, Springer-Verlag Berlin Heidelberg, 1998.

Buyukozturk, O., Hearing, B., and Gunes, O., *Failure of Concrete Beams Strengthened with Fiber Reinforced Plastic Laminates*, Chapter 3, *Mechanics of Quasi-Brittle Materials and Structures*, ISBN: 2-86601-729-3, edited by G.Pijaudier-Cabot, Z. Bazant, and B. Gerard, HERMES Science Publications, Paris, France, 1999.

Buyukozturk, O., and Ulm, F.-J., *The Towers Lost and Beyond*, Chapter 6 *Materials and Structures*, pp.83-106, edited by E. Kausel, MIT, Cambridge, MA, 2002.

Buyukozturk, O., Bungey, J.H., and Al-Qadi, I., editors, *Construction and Building Materials*, Special Issue on Non Destructive Testing: Selected papers from Structural Faults and Repair 2003, Vol.19, No.10, 2005.

O. Buyukozturk and T.-Y. Yu, Chapter 7, *A Novel Structural Assessment Technique to Prevent Damaged FRP-Wrapped Concrete Bridge Piers from Collapse*, *Seismic Risk Assessment and Retrofitting* edited by A. Ilki et al., Springer, ISBN: 978-90-481-2680-4, 2009.

Büyüköztürk, O., M.A. Tasdemir, O. Gunes, Y. Akkaya, editors (2013). *Nondestructive Testing of Materials and Structures*, RILEM Bookseries Vol. 6, 1278p 776 Ills., 370 in color (Part 1 p. 1-750, Part 2 p. 751-1278) Springer Publisher, 2013

JOURNAL PAPERS

Buyukozturk, O., Nilson, A.H. and Slate, F.O., "Stress-Strain Response and Fracture of a Concrete Model in Biaxial Loading," *Journal of the American Concrete Institute*, Vol. 68, No. 8, pp. 590-599, 1971.

Buyukozturk, O. and Nilson, A.H., "Deformation and Fracture of a Particulate Composite," *Journal of the Engineering Mechanics Division, ASCE*, Vol, 98, No. EM-3, pp. 581-593, 1972

Buyukozturk, O. and Marcal, P.V., "Strength of Reinforced Concrete Chambers under External Pressure," Paper No. 75 PVP-7, *Transactions of the ASME Journal of Pressure Vessels Technology*, pp. 309-314, 1975

Buyukozturk, O., "Nonlinear Analysis of Reinforced Concrete Structures," *Journal of Computers and Structures*, Vol. 7, pp. 149-156, 1977

Buyukozturk, O., and Connor, J.J., "Nonlinear Dynamic Response of Reinforced Concrete under Impulsive Loading: Research Status and Needs," *Nuclear Engineering and Design*, Vol. 50, No. 1, pp. 83-92, 1978

Code requirements for Nuclear Safety Related Concrete Structures, ACI Committee 349, *Journal of the American Concrete Institute*, Vol. 75, No. 8, pp.329-35, 1978

De Silva, C.W., Buyukozturk, O., and Wormley, D.N., "Postcracking Compliance Analysis of R/C Beams," *Journal of the Structural Division - ASCE*, Vol. 105, No. ST1, pp. 35-51, 1979

Fardis, M.H., and Buyukozturk, O., "Shear Transfer Model for Reinforced Concrete," *Journal of the Engineering Mechanics Division - ASCE*, Vol. 105, No. EM2, pp. 255-275, 1979.

Fardis, M.N., and Buyukozturk, O., "Shear Stiffness of Concrete by Finite Elements," *Journal of the Structural Division - ASCE*, Vol. 106, No. ST6, pp. 1311-1337, 1980.

Reinforced Concrete Design for Therman Effects on Nuclear Power Plant Structures, ACI Committee 349, *Journal of the American Concrete Institute*, Vol. 77, No. 6, pp. 399-428, 1980.

Code Requirements for Nuclear Safety Related Concrete Structures, ACI 349R-80, Commentary: American Concrete Institute, Special Committee Publication. (Adopted as a standard of the American Concrete Institute),1980

Buyukozturk, O., Connor, J., and Leombruni, P., "Research on Modeling Shear Transfer in Reinforced Concrete Nuclear Structures," *Nuclear Engineering and Design*, Vol. 59, No. 1, pp. 67-83, 1980.

Reinforced Concrete Design for Thermal Effects on Nuclear Power Plant Structures, ACI 349.IR-80, Special ACI Committee Publications, 1981

Buyukozturk, O. and Tseng, T. M., "Thermomechanical Behavior of Refractory Concrete Linings," *Journal of the American Ceramic Society*, Vol. 65, No. 6, pp. 301-307, 1982.

Buyukozturk, O., Connor, J.J., Calvo, J.J., and Tseng, T.M., "Numerical Modeling of Reinforced Concrete Containment Walls Under Cyclic Shear," *Nuclear Engineering and Design*, Vol. 69, No. 2, pp. 261-270, 1982.

Buyukozturk, O. and Tseng, T. M., "Heat Conduction through Layered Refractory Linings," *Journal of the Engineering Mechanics Division, ASCE*, Vol. 109, No. EM4, pp. 1000 -1015, 1983.

Browzin, B.S., Tulga, S.S., and Buyukozturk, O., "Testing and Verification Analysis by Finite Elements of Reinforced Concrete Double Cantilevers," *Nuclear Engineering and Design*, Vol. 79, pp. 187-197, 1984.

Wium, Daniel J.W. and Buyukozturk, O., "Precast Segmental Bridges - Status and Future Directions," *The Journal of Civil Engineering for Practicing and Design Engineers*, Vol. 3, pp. 59-79, 1984.

Buyukozturk, O., and Tseng, T.M., "Concrete in Biaxial Cyclic Compression," *Journal of the Structural Division, ASCE*, Vol. 110, No. ST3, pp. 461-476, 1984.

Wium, Daniel J.W., Buyukozturk, O., Li, V., "Hybrid Model for Discrete Cracks in Concrete," *The Journal of Engineering Mechanics, ASCE*, Vol. 110, No. 8, pp. 1211-1229, 1984.

Wium, D.J.W., and Buyukozturk, O., "Problems in Designing Prestressed Segmental Concrete Bridges," *Transportation Research Board Record, National Academy of Sciences, Second Bridge Engineering Conference*, Vol. 2, pp. 68-75, 1984.

Chen, E.S., and Buyukozturk, O., "Thermomechanical Behavior and Design of Refractory Linings, for Slagging Gasifiers," *American Ceramic Society Bulletin*, Vol. 64, No. 7, pp. 988-994, 1985.

Chen, E.S., and Buyukozturk, O., "Constitutive Model for Concrete in Cyclic Compression," *Journal of Engineering Mechanics, ASCE*, Vol. 111, No. 6, pp. 797-814, 1985.

Chen, E.S., and Buyukozturk, O., "Modeling of Long Term Corrosion Behavior of Refractory Linings in Slagging Gasifiers," *American Ceramic Society Bulletin*, Vol. 64, No. 7, pp. 995-1000, 1985.

Wium, Daniel J.W., and Buyukozturk, O., "Variability in Long-Term Concrete Deformations," *Journal of Structural Engineering, ASCE*, Vol. 111, No. 8, pp. 1792-1809, 1985.

Buyukozturk, O. and Shareff, S. S., "Constitutive Model for Concrete in Cyclic Compression," *Journal of Computers and Structures*, Vol. 21, No. 3, pp. 581 - 610, 1985.

Chen, E.S. and Buyukozturk, O., "Methodology for Thermomechanical Analysis of Brittle Systems," American Ceramic Society Bulletin, Vol. 64, No. 7, pp. 982-988, 1985.

Sacks, R. and Buyukozturk, O., "Expert Interactive Design of R/C Columns Under Biaxial Bending," The Journal of Computing in Civil Engineering, Vol. 1, No. 2, pp. 69-81, 1987.

Chen, E.S., Dicks, L.R., and Buyukozturk, O., "Anchor-Lining Interaction in a Hot-Shell Lining," Ceramic Bulletin, Vol. 69, No. 11, pp. 1813-1820, 1990.

Buyukozturk, O., Bakhoun, M.M., Beattie, S.M., "Shear Behavior of Joints in Precast Concrete Segmental Bridges," ASCE Journal of Structural Engineering, Vol. 116, No. 12, pp.3380-3401, 1990.

Buyukozturk, O., Moussa, R.A., "A Bounding Surface Model For Concrete," Journal of Nuclear Engineering and Design, Vol. 121, pp. 113-125, 1990.

Buyukozturk, O. and Lee, K.M., "Mixed Mode Fracture Concepts in Structural Design," Special Publication Series of American Concrete Institute, SP-134, pp. 47-62, 1992.

Fracture Mechanics; Applications to Concrete Structures and Implications with Regard to the Code, ACI special publication of the Committee 446. Fracture Mechanics, 1992

Pagnoni, T., Slater, J., Ameer-Moussa, R., Buyukozturk O., "A Nonlinear Three-Dimensional Analysis of Reinforced Concrete Based on a Bounding Surface Model," Journal of Computers and Structures, Vol. 43, No. 1, pp. 1-12, 1992.

Lee, K.M., Buyukozturk, O., and Oumera, A., "Fracture Analysis of Mortar-Aggregate Interfaces in Concrete," ASCE Journal of Engineering Mechanics, Vol 118, No. 10, pp. 2031-2047, 1992.

Valle, M. and Buyukozturk, O., "Behavior of Fiber Reinforced High Strength Concrete Under Direct Shear," Materials Journal of American Concrete Institute, Vol. 90, No. 2, pp. 122-133, 1993.

Buyukozturk, O., and K.M. Lee, "Assessment of Interfacial Fracture Toughness in Concrete Composites," Cement & Concrete Composites, Vol. 15, pp.143-151, 1993.

Lee, K.M., Buyukozturk, O and Leung, C.K.Y., "Numerical Evaluation of Interface Fracture Parameters Using ADINA," Journal of Computers and Structures, Vol. 47, No. 4/5, pp. 547-552, 1993.

Valle, M., and Buyukozturk, O., "Behavior of Fiber Reinforced High Strength Concrete Under Direct Shear," Fiber Reinforced Concrete Developments and Innovations, ACI SP-142, pp. 201-233, 1994.

Lee, K.M., Buyukozturk, O., "Fracture Toughness of Mortar-Aggregate Interface in High Strength Concrete," ACI Materials Journal, V. 92, No. 6, pp.634-642, 1995.

Buyukozturk, O., and Rhim, H.C., "Modeling of Electromagnetic Wave Scattering by Concrete Specimens," Journal of Cement and Concrete Research, Vol. 25, No. 5, pp. 1011-1022, 1995.

Rhim, H.C., and Buyukozturk, O. Blejer, D.J., "Remote Radar Imaging of Concrete Slabs With and Without a Rebar," *Materials Evaluation, The Journal of the American Society of Nondestructive Testing*, Vol. 53, No. 2, pp. 295-299, 1995.

Finite Element Analysis of Fracture In Concrete Structures, reported by ACI Committee 446 of which O. Buyukozturk was sub-committee member 3 contributing to the report, American Concrete Institute, 1996

State of the Art Report on Dynamic Fracture, reported by ACI Committee 446, of which O. Buyukozturk was a contributing member , American Concrete Instutue R-8860, 1996

Shahbazker, A., and Buyukozturk, O., "Shear Design and Behavior of Fiber Reinforced High Strength Concrete Beams," *ACI Structural Journal*. 1996

Buyukozturk, O., and Rhim, H.C., "Radar Imaging of Concrete Specimens for Nondestructive Testing," *Construction and Building Materials*, Vol. 11, No. 3, pp. 195-198, 1997.

Buyukozturk, O., "Imaging of Concrete Structures," *NDT & E International*, Vol. 31, No. 4, pp. 233-243. 1998

Trende, U. and Buyukozturk, O., "Size Effect and Influence of Aggregate Roughness in Interface Fracture of Concrete Composites," *ACI Materials Journal*, Vol. 95, No. 4, pp. 331-338, 1998.

Rhim, H. C. and Buyukozturk, O., "Electromagnetic Properties of Concrete at Microwave Frequency Range," *ACI Materials Journal*, Vol. 95, No. 3, pp. 262-271, 1998.

Buyukozturk, O., and Hearing, B., "Failure Behavior of Precracked Concrete Beams Retrofitted with FRP," *ASCE Journal of Composites for Construction*, Vol. 2, No. 3, pp. 138-144, 1998.

Buyukozturk, O. and Hearing, B., "Crack Propagation in Concrete Composites Influenced by Interface Fracture Parameters," *International Journal of Solids and Structures*, Vol. 35, Nos. 31-32, pp. 4055-4066, 1998.

Test Methods and Modeling fo Determining the Mechanical properties of the ITZ in Concrete, RILEM Committee 159-ETC, 1999

Test Methods for Measurement of the Strain - Softening Behavior of Concrete Under Uniaxial Compression, RILEM TC-148-SSC Committee paper, and Recommendations for Testing, 1999.

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Buyukozturk, O., Rhim, H. C., Soon, K.A, Guk-Gwang, N., "Characteristics of Pressure Confined Concrete Under Cyclic Compression," *KCI International Journal*, 2001.

Rhim, H. C., Buyukozturk, O., Soon, K.A, Gwang-Ho, K., "Characteristics of Pressure Confined Concrete Under Monotonic Compression," KCI International Journal, Vol. 13, No. 1, pp. 53-60, 2001.

Buyukozturk, O. and Gunes, O., "Advances in Earthquake Risk Assessment and Hazard Mitigation for Urban Infrastructure with High Characteristic Variability", ARI Journal of Physical and Engineering Sciences, Vol. 53, No. 2, pp. 38-57, 2003.

Buyukozturk, O., Gunes O., and Karaca, E., "Progress in Understanding Debonding Problems in Reinforced Concrete and Steel Members Strengthened Using FRP Composites", International Journal of Construction and Building Materials, Vol. 18, No.1, pp. 9-19, 2004.

Au, C. and Buyukozturk, O., "Effect of Fiber Orientation and Ply Mix on Fiber Reinforced Polymer-Confined Concrete," Journal of Composites for Construction, ASCE, Vol.9, No.5, pp. 397-407, 2005.

Au, C. and Buyukozturk, O., "Debonding of FRP Plated Concrete: A Tri-layer Fracture Treatment." International Journal of Engineering Fracture Mechanics, Vol.73, pp.348-365, 2006.

Au, C. and Buyukozturk, O., "Peel and Shear Fracture Characterization of Debonding in FRP Plated Concrete Affected by Moisture." Journal of Composites for Construction, ASCE, Vol.10, No.1, pp. 35-47, 2006.

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T.-Y. Yu and O. Buyukozturk, "A Far-field Airborne Radar NDT Technique for Debonding and Rebar Detection in GFRP-retrofitted Concrete Structures," NDT&E International, Vol. 41, pp.10-24, 2008.

O. Buyukozturk, C. Tuakta, D. Lau, "Durability of Cementitious Materials and Multi-material Systems," Journal of Concrete Society, No. 89, pp. 64-75, September/October 2008.

O. Gunes, O. Buyukozturk, E. Karaca, "A Fracture-based Model for FRP Debonding in Strengthened Beams", Engineering Fracture Mechanics 76 (12), 1897-1909, 2009

O. Buyukozturk and T.-Y. Yu, "Far-field Radar NDT Technique for Detecting GFRP Debonding from Concrete," International Journal of Construction and Building Materials, Vol. 23, pp.1678-1689, 2009.

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D. Lau and O. Buyukozturk, "Fracture Characterization of Concrete/Epoxy Interface Affected by Moisture," Mechanics of Materials, Vol.42, No.12, pp.1031-1042, 2010

E. Yuksel, H. Ozkaynak, O. Buyukozturk, C. Yalcin, A.A. Dindar, M. Surmeli and D. Tastan, "Performance of alternative CFRP retrofitting schemes used in infilled RC frames," *Construction and Building Materials*, Vol.24, No.4, pp.596-609, 2010

C. Tuakta and O. Buyukozturk, "Deterioration of FRP/concrete bond system under variable moisture conditions quantified by fracture mechanic." *Composite Part B: Engineering*, Vol.42, No.2, pp.145-154, 2011

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Buyukozturk, O., Buehler, M.J., Lau, D. and Tuakta, C., "Structural Solution Using Molecular Dynamics: Fundamentals and a Case Study of Epoxy-Silica Interface", *International Journal of Solids and Structures* 48 (14-15): 2131-2140, 2011

T. Emge and O. Buyukozturk, "Remote Nondestructive Testing of Composite-steel Interface by Acoustic Laser Vibrometry", *Materials Evaluation* 70(12): 1401-1410, 2012

Gunes, O. and Buyukozturk, O., "Simulation-based microwave imaging of plain and reinforced concrete for nondestructive evaluation", *International Journal of Physical Sciences* 7 (3): 383-393, 2012

Denvid L., O. Buyukozturk, and M. J. Buehler, "Characterization of the intrinsic strength between epoxy and silica using a multiscale approach", *Journal of Materials Research* 27(14): 1787-1796, 2012

Gunes, O., Lau, D., Tuakta, C., & Büyüköztürk, O.. Ductility of FRP–concrete systems: Investigations at different length scales. *Construction and Building Materials*, Vol. 49, Dec. 2013, pp. 915–925, 2013

Çelebi, M., Toksöz, N., & Büyüköztürk, O.. Rocking behavior of an instrumented unique building on the MIT campus identified from ambient shaking data. *Earthquake Spectra* 2014; 30(2): 704-720.

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“Material Nonlinear Three-Dimensional Analysis of Concrete Structures,” ASCE Fall Convention, Chicago, IL., October, 1978.

“Analysis of Coal Gasification Process Vessels,” Fall Convention of the American Ceramic Society, Bedford, PA., October, 1979.

“Finite Element Modeling of Shear Transfer in Concrete,” Lecture at the University of Connecticut, Storrs, CT., February, 1979.

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“Design of Offshore Gravity Structures,” series of lectures for the 7th Regional Conference on Earthquake Engineering, Istanbul, Turkey, September, 1979.

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“What is Engineering?: Design and Construction of Fixed Offshore Structures,” Freshman Seminar, Massachusetts Institute of Technology, Cambridge, MA, October 1980.

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“Series of Presentations on Experimental and Analytical Investigations in Concrete Bridge Engineering,” Technical University of Berlin, West Germany, June 21-24, 1982.

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“Development of Analytical Models for Describing Thermomechanical Behavior of Refractory Systems,” Argonne National Laboratories, Argonne, IL, January 6, 1983.

“Behavior of Engineering Materials for High Temperature Applications,” CEMCOM Research Association, Prince Frederick, MD., January 28, 1983.

“Analysis of Concrete Structures for High Temperature Effects,” Engineering Mechanics Seminar, Istanbul Technical University, Ayazaga, Istanbul, Turkey, May 5, 1983.

“Design of Offshore Structures,” Special Short Course, Istanbul Technical University (sponsored through the Technology Transfer Program of the United Nations), Istanbul, Turkey, March, 1983.

“Numerical Modeling of the Behavior of Concrete in Cyclic Stress,” Materials Seminar, Istanbul Technical University, Ayazaga, Istanbul, Turkey, May 30, 1983.

“Finite Element Analysis of Reinforced Concrete Structures,” Aegean University, Izmir, Turkey, May 13, 1983.

“Fundamentals of Offshore Engineering,” Middle East Technical University, Institute of Marine Sciences, Erdemli Mersin, June 6, 1983.

“A Hybrid Finite Element-Dislocation Method to Model Discrete Cracking in Concrete,” US-Netherlands Cooperative Research, Delft, Netherlands, June 22-24, 1983.

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“Segmental Concrete Bridges,” Transportation Research Board, Minneapolis, MN, September, 1984

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“Short Course on Finite Element Analysis of Concrete Structures,” Technical University of Berlin, Berlin, West Germany, June, 1985.

“Finite Element Analysis of Reinforced Concrete,” US-Japan Conference, Tokyo, Japan, May, 1985.

“Lining System Design,” ARMCO, Middleton, OH, March, 1985.

“High Temperature Materials,” Norton Co., Worcester, MA, October, 1985.

"Prestressed Concrete Bridge Design in the USA," two invited papers in the Symposium on Concrete Structures, Berlin, West Germany, April 1985.

"Fracture of Concrete," 4th International Conference on Numerical Methods in Fracture Mechanics, San Antonio, TX., March, 1987.

"The Use of Computers in Engineering Analysis and Design," European Symposium on Computational Methods, Istanbul Technical University, Istanbul, Turkey, June, 1988.

"Use of Epoxies in Concrete Bridges," Annual Meeting of Transportation Research Board, Washington, DC, January, 1988.

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"High Temperature Creep Behavior of Refractory Concretes," USINOR, Metz, France, July, 1989.

"Design of High Temperature Systems," RADEX, Radenthein, Austria, June, 1989.

"Behavior of Concrete Bridges," Technical University of Berlin, Berlin, West Germany, July, 1989.

"Assessment of the Fatigue Life of Railway Bridges," Presentation at the AAR Affiliated Rail Program at Massachusetts Institute of Technology, Cambridge, MA, October 30, 1991.

"Fracture Behavior of Aggregate Mortar Interfaces," American Concrete Institute, Spring Convention, Session on Fracture Mechanics of Dams, Boston, MA, March 17-21, 1991.

"High Strength Cement Composites for Marine Applications," Massachusetts Institute of Technology, Sea Grant Marine Industry Colloquium on Advanced Composites for Offshore Structures, Cambridge, MA, October 30-31, 1991.

"Characterization of Fiber Reinforced High Strength Concrete," International Symposium for Developments in Fiber Reinforced Concrete and Ferrocement, American Concrete Institute, 1991 Fall Convention, Session II, Dallas, TX., November 10-15, 1991.

"Development of High performance Materials," Symposium L004 on Innovation in Development and Characterization of Materials for Infrastructure, Materials Research Society 1991 Fall Meeting, Boston, MA., December 2-6, 1991.

"Fiber Reinforced Concrete Composites," Lecture at Milan Polytechnic, Milan, Italy; May 23, 1991.

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Lectures at Technical University of Berlin, Berlin, Germany: "Application of Fiber Reinforced Concrete Composites to Innovative Bridge Design," April 24, 1991; "Application of Interface Fracture Mechanics to Concrete," April 25, 1991.

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“Interface Fracture and Crack Propagation in Concrete Composites,” 13th Annual Materials Conference on Micromechanics of Concrete and Cementitious Composites, Swiss Federal Institute of Technology, Lausanne, Switzerland, March 9-11, 1993.

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“Use of High Frequency Wideband Radar for Condition Assessment of Infrastructure,” Raytheon Company, Equipment Development Laboratory (Greg Behr, Manager), Sudbury, MA., May 24, 1994.

“Simulation of Wideband Radar Measurements for Concrete,” Structural Materials Technology – An NDT Conference, Sponsored by FHWA and NJDOT, Atlantic City, New Jersey, February 23-25, 1994.

“Thermomechanical Deformation Model or High Temperature Fluewall Systems,” Comalco Research and Technology Center, Thomastown, Victoria, Australia, June 2, 1994.

“Thermomechanical Design of Carbon Bake Furnaces for the Aluminum Production Facilities,” New Zealand Aluminum Smelters, Invercargill, New Zealand, June 7, 1994.

“Design and Construction of Segmental Prestressed Concrete Bridges - A Case Study: Imrah Viaduct,” Middle East Technical University, Department of Civil Engineering, Turkey, March 18, 1994.

“Fatigue Damage Assessment and Prediction of Remaining Life of Railroad Steel Bridges,” Lecture given to a large group of Japanese Industrial and University representatives, organized by MIT Industrial Liason Office and Professor Tetsuo Yai of Tokyo Institute of Technology, MIT E-38, May 4, 1994.

“Wideband Radar Imaging of Concrete Dams,” Workshop Presentation at Waterway Experiment Station, Vicksburgh, MS, May 9, 1994.

“Nondestructive Testing of Concrete Using Radar,” main lecture in International Symposium on Nondestructive Testing in Civil Engineering (NDT-CE), Berlin, Germany, September 26-28, 1995.

“Computational Methods in Material Design and Assessment Technology,” American Concrete Institute, 1995 Spring Convention, Salt Lake City, Utah, March 5-10, 1995.

“Deterioration and Fatigue Life Prediction of Steel Railway Bridges,” ICSAS '95 Third International Conference on Steel and Aluminum Structures, Istanbul, Turkey, May 24-26, 1995.

“Radar Imaging of Reinforced Concrete Specimens for Non-destructive Testing,” International Conference on Non-destructive Evaluation of Aging Infrastructure organized by the International Society for Optical Engineering (SPIE), Oakland, CA, June 6-8, 1995.

“Radar Measurements of Concrete for Non-destructive Evaluation of Dams,” International Conference on Non-destructive Evaluation of Aging Infrastructure organized by the International Society for Optical Engineering (SPIE), Oakland, CA, June 6-8, 1995.

“Radar Imaging of Concrete Specimens for Non-destructive Testing,” 6th International Conference on Structural Faults and Repair - 95, Westminster, London, July 3-5, 1995.

“Nondestructive Testing Methods in Civil Engineering” at the Department of Civil Engineering, Institute for Structures and Construction, Technical University of Berlin, Berlin, Germany, September 29, 1995.

“International Symposium on Nondestructive Testing (NDT-CE),” Liverpool, England. July 1997.

“Use of Composite Materials in Repair and Retrofit of Structures,” PPG Industries, Fiber Glass Research Center, Pittsburgh, Pennsylvania, 1998.

Plenary Keynote: “Assessment and Repair of Reinforced Concrete Structures,” International Conference on Repair and Restoration of Reinforced Concrete Structures, Budapest, Hungary, April 15-16, 1998.

“Deterioration and Nondestructive Evaluation of Concrete,” International Symposium on Performance of Concrete Structures in the Arabian Gulf Environment, Dhahran, Saudi Arabia, November 15-17, 1998.

“Failure of Concrete Strengthened with Composite Laminates,” International Workshop on Mechanics of Quasi-Brittle Materials and Structures, Prague, Czech Republic, March 26-28, 1998.

“Nondestructive Testing Using Microwave,” International Conference on Repair and Restoration of Reinforced Concrete Structures, Budapest, Hungary, April 15-16, 1998.

“Performance of Retrofitted Concrete Using FRP,” International Symposium on Performance of Concrete Structures in the Arabian Gulf Environment, Dhahran, Saudi Arabia, November 15-17, 1998.

“Assessment and Repair of Earthquake Damaged Buildings,” Earthquake Emergency Conference, Bogazici University, Istanbul, Turkey, September 2, 1999.

Plenary Keynote: “Strengthening and repair of structures using FRP materials,” International Conference on Strengthening or upgrading Structures Using advanced Composite Materials, Organized by Singapore Concrete Institute, Singapore, May 27, 1999.

Plenary Keynote: “FRP strengthening and repair: Where do we go from here?” 8th International Conference and Exhibition, Structural Faults and Repair 99, London, England, July 13-15, 1999.

Plenary Keynote: “Strengthening and Repair of Existing Structures Using FRP Composites,” 15th Technical Congress of the Turkish Society of Civil Engineers, Ankara, Turkey, November 24-26, 1999.

Plenary Keynote: “Advanced Technologies in Earthquake Engineering: assessment and Strengthening,” Keynote Lecture, ITU-IAHS International Conference on the Kocaeli Earthquake, 17 August 1999, Istanbul, Turkey, December 2-5, 1999.

Plenary Keynote: “Deterioration and Nondestructive Evaluation of Concrete Structures,” National University of Singapore, Singapore, May 25, 1999.

“Fracture Behavior and Ductility of High Strength Concrete,” National University of Singapore, Singapore, May 31, 1999.

“Strengthening and repair of Structures Using FRP Composites,” National University of Singapore, Singapore, June 2, 1999.

“Information Technology and Nondestructive Evaluation of Structures,” 6th International Conference on Structural Failure Durability and Retrofitting, Singapore, September 14-15, 2000.

Plenary Keynote: “Nondestructive Evaluation of Concrete,” The International Conference on High Performance Concrete, Hong Kong, Shenzhen, December 10-15, 2000.

Plenary Keynote: “Multi Resolution Assessment of Structural Integrity,” National University of Singapore (NUS)-MIT Conference on Sustainable Infrastructure Development, January 26, 2000.

Plenary Keynote: “Repair and Strengthening of Reinforced Concrete Structures,” IMO(Professional Engineering Society) Symposium on Earthquake Engineering, Istanbul, Turkey, July 5, 2000.

Plenary Keynote: “Innovative Technologies in Earthquake Resistant Structures,” 6th International Conference on Structural Failure Durability and Retrofitting, Singapore, September 14-15 2000.

“Base Isolation: An Innovative Technology for Seismic Retrofit of Buildings,” Istanbul Technical University, Istanbul, Turkey, May 22, 2001.

Plenary Keynote: “Use of Concrete in Tall Buildings, Keynote Lecture,” Symposium on Building a Safer, Stronger New York City, New York, NY, December 13, 2001.

“Base Isolation of Historical Buildings of Robert College in Istanbul – A Case Study,” Gebze Institute of High Technology, Gebze, Turkey, May 24, 2001.

“Collapse of World Trade Center Towers,” A forum on Structural Engineers Perspectives of the World Trade Center, Massachusetts Institute of Technology, Cambridge, MA, October 3, 2001.

“Monitoring Fatigue Crack Growth in Steel Bridges Using Acoustic Emission Techniques,” presentation to the Technology Scanning Committee of American Association of Railroads, October 11, 2001.

“Material Research and Development at MIT,” DARPA Battle Damage Indicator Workshop, Institute for Defense Analyses, Alexandria, Virginia, November 1, 2001.

“Earthquake Risk Assessment and Hazard Reduction for Structures: Opportunities for Synergistic Collaboration,” NSF-TUBITAK Turkey/Taiwan Grantee Workshop, Antalya, Turkey, March 24-26, 2002.

Plenary Keynote: “Advances in Earthquake Risk Assessment and Hazard Reduction for Large Scale Inventory of Structures with High Characteristic Variability,” 5th International Congress on Advances in Civil Engineering, Istanbul, Turkey, September 25-27, 2002.

“Recent Developments in Advanced Construction Materials and Assessment Technologies,” CEMEX International, Monterrey, Mexico, September 13, 2002.

“Development of FRP Composites for Infrastructure Applications,” FHWA/DOT/FRA/FTA Workshop, Washington DC, November 21, 2002.

“Characterization and Modeling of Debonding in RC Beams Strengthened with FRP Composites,” 15th ASCE Engineering Mechanics Conference, New York, NY, June 2-5, 2002.

“Debonding Problems in Seismic Retrofitting of RC Beams Using FRP Composites,” 7th U.S. National Conference on Earthquake Engineering, Boston, Massachusetts, July 21-25, 2002.

“Damage Mechanics and Detection in FRP Bonded Systems: Potential Role of Finite Element Method,” 2nd US-Japan Workshop on FEARCS, Makena, Maui, November 2-4, 2003.

Plenary Keynote: “Non-destructive Evaluation of FRP Confined Concrete using Microwave,” NDTCE, International Conference on Nondestructive Testing in Civil Engineering, Berlin, Germany, September 13, 2003.

Plenary Keynote: “Understanding Debonding Problems in Reinforced Concrete and Steel Members Strengthened using FRP composites,” International Conference on Structural Faults and Repair, Commonwealth Institute, London, UK, July 1-3, 2003.

Plenary Keynote: “Structural Health Monitoring and Seismic Impact Assessment,” 5th National Conference on Earthquake Engineering, Istanbul, Turkey, May 26-30, 2003.

“Use of Advanced Composites in Maglev Guideway Systems – The MIT Perspective,” USDOT/TRB Meeting, Washington D.C., January 12-14, 2003.

“Structural Failures: Causes and Effects,” Disaster Management Center, Istanbul Technical University, Maslak main campus, Istanbul, Turkey, May 27, 2004.

Plenary Keynote: “The Collapse of Twin Towers: Causes and Effects,” EFCA2004 Conference and GAM, Istanbul, Turkey, May 22-27, 2004.

Plenary Keynote: “High-rise Buildings: Evolution and Innovations,” CIB2004 World Building Congress, Toronto, Canada, May 2-7, 2004.

“Nondestructive Evaluation of FRP-confined Concrete using Microwave,” MIT-Lincoln Laboratory, Lexington, Massachusetts, December 14, 2005.

“Challenges in Civil and Environmental Engineering Education – Materials and Structural Systems”, NSF sponsored International Workshop on Reforming Civil and Environmental Engineering Education, Istanbul, Turkey, October 4, 2006.

Plenary Keynote: "Understanding and assessment of debonding failures in FRP-concrete systems", 7th International Congress on Advances in Civil Engineering (ACE-2006), Istanbul, Turkey, October 11, 2006.

Plenary Keynote: "Detecting deterioration behind GFRP-wrapped strengthening of bridge columns", 11th International Conference on Structural Faults + Repair – 2006, Edinburgh, Scotland, UK, June 12, 2006.

"Hygro-thermo Effects in FRP-Concrete Systems – A Tri-layer Fracture Problem," Annual Mustafa Inan Lecture, Istanbul Technical University, Istanbul, Turkey, April 18, 2006.

"How Durable is FRP-Plated Concrete under Moisture?" International Conference on FRPRCS- 8, University of Patras, Patras, Greece, July 16-18, 2007.

" Civil Engineering Education: Do We Need a Fifth Year?" First FABED International Workshop on Challenges in Civil Engineering Education in View of Societal and Technical Realities, ITU, Istanbul, Turkey, October 22-23, 2007.

"High Performance Concrete: Fundamentals and Application," International Conference on New Developments in Concrete Technologies, Istanbul, Turkey, November 27-28, 2007.

"A Novel Structural Assessment Technique to Prevent Damaged FRP-Wrapped Concrete Bridge Piers from Total Collapse," International Workshop on Measures for the Prevention of Total Collapse of Existing Low-Rise Structures, Istanbul, Turkey, November 19-20, 2007.

A Distant Real-time Radar NDE Technique for the in-depth Inspection of Glass Fiber Reinforced Polymer-retrofitted Concrete Columns," 15th Annual International Symposium on "Smart Structures and Materials & Nondestructive Evaluation and Health Monitoring" of SPIE, San Diego, California, March 11-12, 2008.

Plenary Keynote: "Durability of Cementitious Materials," 11th International Conference on the Durability of Building Materials and Components, Istanbul, Turkey, May 11-14, 2008.

Civil Engineering Education Reform, ASCE Structures Congress, Austin, April 30, 2009.

Plenary Keynote: "Very High Frequency Radar and Non-contact NDT", Telford Institute Workshop on "Developments in Sonic & Radar NDT of Infrastructure", May 12, 2009, Edinburgh, Scotland.

Plenary Keynote: "Engineering Education for a Changing World", International Engineering Education Conference, November 4, 2010, Antalya, Turkey.

Plenary Keynote: "Earthquake Risk Assessment and Hazard Reduction for Large Inventory of Structures", Conference on Advances in Earthquake Engineering, Turkish Chamber of Civil Engineers, November 6, 2010, Antalya, Turkey.

O. Buyukozturk (2011), "Remote Detection of Debonding in FRP-strengthened Concrete Structures using Acoustic-Laser Technique", International Symposium on Nondestructive Testing of Materials and Structure, Istanbul, Turkey, May, 2011.

Plenary Keynote: Buyukozturk, O. (2011), "Bridge Engineering and Education: Developments and Challenges", 2nd Symposium on Bridges and Viaducts, IMO, Eskişehir 28 – 30 September 2011.

Opening Plenary Keynote lecture Buyukozturk, O. (2012), "Deterioration and performance modeling of epoxy concrete interfaces in structures ", 1st International Conference on Performance-based and Life-cycle Structural Engineering (PLSE) 2012, Hong Kong, China, December 5, 2012.

Plenary Keynote: Buyukozturk, O. (2012), "Restructuring Engineering Education Curriculum", International Engineering Education Conference, October 31, 2012, Antalya, Turkey.

Plenary Keynote: Buyukozturk, O. (2012), "Deterioration and performance modeling of epoxy concrete interfaces in structures", 1st International Conference on Performance-based and Lifecycle Structural Engineering (PLSE) 2012, Hong Kong, China, December 5, 2012.

Plenary Keynote: Buyukozturk, O. (2012), "Durability and Long-Term Performance Modeling of FRP-Concrete Systems", Proceedings of the 6th International Conference on FRP Composites in Civil Engineering CICE 2012, Rome, Italy, June 13-15, 2012.

Invited lecture Buyukozturk, O. (2012), "Developments in Engineering Research and Education", City University of Hong Kong, Hong Kong, China, December 7, 2012.

Invited presentation Buyukozturk, O. (2012), "Sustainability of Built Environment", Workshop organized by Kuwait Foundation for the Advancement of Science, Kuwait, January 17, 2012.

Invited lecture Buyukozturk, O. (2012), "New Trends in Engineering Research and Education", Hong Kong University of Science and Technology (HKUST), Hong Kong, China, December 3, 2012.

Invited presentation Buyukozturk, O. (2012), "Material Innovations and Sustainability in Civil Infrastructures", NSF CMMI Engineering Research and Innovation Conference, July 11, 2012.

Plenary Keynote lecture Buyukozturk, O. (2012), "Restructuring Engineering Education Curriculum", International Engineering Education Conference, October 31, 2012, Antalya, Turkey.

Plenary Keynote lecture Buyukozturk, O. (2012), "Durability and Long-Term Performance Modeling of FRP-Concrete Systems", 6th International Conference on FRP Composites in Civil Engineering CICE 2012, Rome, Italy, June 15, 2012.

Buyukozturk, O. (2013) "Sustainability of Kuwait's Built Environment", Kuwait-MIT Center for Natural Resources and the Environment (CNRE), MIT, October 8, 2013 (Cambridge, MA)

“Monitoring Seismic Safety and Structural Integrity of Tall Buildings, 8th Gulf Seismic Forum, Muscat, Oman, March 3, 2013.

Buyukozturk, O. (2013) “Motion sensing and damage detection of facilities using wireless sensor networks”, Shell-MIT Workshop on Grand Challenges, January 31,2013. Shell Technology Centre, Rijswijk, Netherlands

“Multi-sensor monitoring of structures, measurement, inference, and visualization”, Shell External Sponsored Research Workshop, Houston, January 28,2014,Texas, USA.

“Perspectives on Quantitative Sustainability of Civil Infrastructure”, 11th International Congress on Advances in Civil Engineering (ACE), October 21,2014, Istanbul, Turkey (Plenary Keynote Lecture)

“2ECEES Energy-based Design for Seismic Resistance”, Aug. 28, 2014, Second European Conference on Earthquake Engineering and Seismology (2ECEES), Istanbul, Turkey, 2014.

“Measurement based system identification and modeling approach for dynamic analysis of tall buildings: Case study of Green Building at MIT campus”, Kuwait University, Kuwait City, Kuwait, 2014

“Research Trends and Field Measurement Based System Identification of a Tall Building at MIT”, Istanbul Technical University, Istanbul, Turkey, February 24,2014

“Blind Modal Identification and Substructural Model Updating of High Rise Buildings” April 6-9, 2015, 9th Gulf Seismic Forum, Kuwait Institute for Scientific Research.

“Grand Challenges for Sustainable Infrastructure”, Infrastructure Innovation in a Changing Environment, MIT CEE and ILP, Cambridge, MA November 20, 2015.

Plenary Keynote: International Conference on advances in Civil and Environmental Engineering (ICOCEE), Copadoccia, Turkey, May 20, 2015.

“Advances in Infrastructure” May 21, 2015 University of Nevsehir School of Engineering. 2015.

“Advanced Technologies for Sustainable Structures” PTC Holding Corporation, presentation to engineers and executives, Makati City, Manila, Philippines, July 18, 2016.

“Distributed Sensing and Wireless Monitoring of Structures” MITEI- Shell Research Conference, Cambridge, MA, May 11, 2016.

“Quantitative Sustainability of Infrastructure: Innovation in Materials and Structural Sensing” Institute of Structural Engineering, ETH Zurich, Switzerland, May 30, 2016.

Innovative Structural Technologies for the Assessment of Cultural Heritage” Heritage Workshop, Privernum, Italy, June 19, 2016.

“Development in Computational Material Design- Lessons from the Roman Concrete” Material Innovations Workshop, Pompeii, Italy, June 23, 2016.

Plenary Keynote: “Towards Inexpensive, Durable, Easy-to-Pour and-Cure, Functionalized Nuclear Grade Concrete, Conference on Nuclear Beyond LWRs, Cambridge, MA, November 2, 2016.

“Bio-inspired Design for Durable Concrete” Istanbul Technical University, Istanbul, Turkey, January 22, 2016.

“Sustainability of the Kuwait’s Built Environment: Outreach to Scientists, Engineers, and Developers” Kuwait Foundation for the Advancement of Sciences (KFAS), Kuwait, April 25, 2016.

“Current Research and State of the Art Technologies for Bridges and Structures” Indonesian Ministry of Public Works and Housing, Bali, Indonesia, July 20, 2016.

“Developments in Materials Research – Atomistic Approaches” GRINM (General Research Institute for Non-Ferrous Materials), Beijing, China, July 22, 2016.

"Project BeeView: Measurement and Monitoring of Structure", Northeastern University, Department of Civil and Environmental Engineering, May 5, 2016.

External International Review Panel organization, workshop, presentations related to MIT-Kuwait project:18-20, January 2016.

“Multiscale modelling for sustainable and durable concrete”. 1st International Conference on Construction Materials for Sustainable Future, 19-21 April, 2017, Zadar, Croatia organized by University of Zagreb. (Invited Talk, Served as the Scientific Committee member)

“Designing for resilience from atoms to structures”. Workshop on Advanced technologies in structural engineering for more resilient communities, The National Academies of Sciences, Engineers, Medicine, Irvine California September 26th 2017. (Invited lecture)

✓ **HONORS AND AWARDS**

2009 Fellow Royal Society of Edinburgh, Scotland’s, National Academy of Science and Letters

2011 Golden Mirko Ros Medal from EMPA Swiss Federal Laboratories for Materials Science and Technology, for “Most valuable and sustained contribution to materials science and engineering in the domain of civil engineering and also for his outstanding research support to EMPA over the past two decades”

1990 Fellow American Concrete Institute (ACI)

1992 National Award for work on “Rail Bridge Fatigue” from AREA

1992 American Railway Engineering Association National Award for work on “Rail Bridge Fatigue”

1993 ACI Research and Education Award for work on “Fiber Reinforced High Strength Concrete”,

- 1994 SEM Best Paper prize
- 1996 Swiss Board Appointed Member, International Panel to evaluate research and teaching of (ETH, EPFL, EMPA), Swiss Federal Institutions
- 2002 Listed in Who's Who in Engineering Education (WWE)
- 2006 ASCE Best Basic Research Paper Award
- 2008 American Society of Nondestructive Testing (ASNT) Faculty Fellowship Award
- 2011 American Society of Nondestructive Testing (ASNT) Faculty Fellowship Award
- 2014 Recognition as Top Author, Elsevier international journal Construction and Building Materials

Awards with Students and Postdoc

- 1995 Goody Prize for work on "Bridge Instrumentation" (G. Grippo, graduate student)
- 1990 Goody Prize (C. Schwitter, student)
- 2007 Goody Prize (Denvid Lau, Graduate Student)
- 2015 MIT Distinguished Freshman Award for Research (Cheahuychou Mao, Undergraduate Student)
- 2016 MIT Distinguished Freshman Award for Research (Stephanie Chin, Undergraduate Student)
- 2016 MIT CEE Innovation@One Business Pitch Champion First Place (Justin Chen, Graduate Student)
- 2016 3rd Annual MIT CEE Video Competition, People's Choice Award (Justin Chen, Graduate Student)
- 2017 EMI Best Paper Award (Murat Uzun, Graduate Student)
- 2017 EMI Best Paper Award (Reza Mohammadi-Ghazi, Graduate Student)
- 2017 The Most Practical SHM Solution for Civil Infrastructures Award, \$1000 Prize, to Abe Davis and Justin Chen (Graduate student) for the SHM in Action demonstration at IWSHM 2017
- 2018 Forbes' 30 Under 30: Science (Postdoc Hao Sun)

✓ **TEACHING**

- MIT OpenCourseWare 1.054/1.541 Mechanics and Design of Concrete Structures as taught in Spring 2004
- MIT OpenCourseWare 1.051 Structural Engineering Design as taught in Fall 2003
- MIT OpenCourseWare 22.314J/1.56J/2.084J Structural Mechanics in Nuclear Power Technology as taught in Fall 2006
- 1.036 Structural Mechanics and Design. New core subject (2016) for the mechanics track of the 1.ENG undergraduate degree program.
- 1.036 (Old) Structural and Geotechnical Engineering Design. Required course in the former 1-C Civil Engineering.
- 21W.781/ESD.032J Colossal Failures in Engineering. Institute-wide course freshman/sophomore special class.

- 1.52 Structural Analysis and Design
- 1.543 Advanced Bridge Design
- 1.544 Advanced Design jointly with MIT Architectural Department and Harvard School of Design emphasizing innovations in deployable structures (Principal Lecturer)
- 1.553J Analysis and Design of Offshore Structures sponsored by Sea Grant (Principal Lecturer)
- 16.29S Advances in Finite Element Methods in Structural Mechanics (Lecturer)

✓ **GRADUATE THESIS SUPERVISION**

PH.D. STUDENTS

- T-M Tseng, 1982 (Civil and Environmental Engineering, MIT)
- E.S. Chen, 1984 (Civil and Environmental Engineering, MIT)
- D.J.W. Wium, 1984 (Civil and Environmental Engineering, MIT)
- S. Lo, 1986 (Civil and Environmental Engineering, MIT)
- K.A. Soon, 1987 (Civil and Environmental Engineering, MIT)
- F. G. Tamer, 1989 (Civil and Environmental Engineering, MIT)
- M. Bakhoun, 1990 (Civil and Environmental Engineering, MIT)
- K.M. Lee, 1993 (Civil and Environmental Engineering, MIT)
- H.C.Rhim, 1995 (Civil and Environmental Engineering, MIT)
- B. Hearing, 2000 (Civil and Environmental Engineering, MIT)
- N.Olson, 2002 (Civil and Environmental Engineering, MIT)
- O. Gunes, 2004 (Civil and Environmental Engineering, MIT)
- W. Zhao, 2005 (Civil and Environmental Engineering, MIT)
- C. Au, 2005 (Civil and Environmental Engineering, MIT)
- E. Karaca, 2005 (Civil and Environmental Engineering, MIT)
- Tzu-Yang Yu, 2008 (Civil and Environmental Engineering, MIT)
- C. Tuakta, 2011 (Civil and Environmental Engineering, MIT)
- Denvid Lau, "Debonding a Bi-layer Material Systems under Moisture Effect: A Multiscale Approach," 2012 (Civil and Environmental Engineering, MIT)
- Justin Chen, "Video Camera-Based Vibration Measurement of Infrastructure," June 2016 (Civil and Environmental Engineering, MIT)
- Reza Mohammadi, "Intelligent Sensing of Material and Structural Systems," - (Civil and Environmental Engineering, MIT)
- Sina Moeini Ardakani, "Atomistic Strength of Cement Paste," - (Civil and Environmental Engineering, MIT)
- Murat Uzun, - (Civil and Environmental Engineering, MIT)
- Steven Palkovic, "Atomistic and Multiscale Analysis of CSH," - (Civil and Environmental Engineering, MIT)
- James Long, "One Class Machine Learning," - (Civil and Environmental Engineering, MIT)

M.SC. STUDENTS

- P. Leombruni, 1979 (Civil and Environmental Engineering, MIT)

- Y.Y. Lam, 1979 (Civil and Environmental Engineering, MIT)
- S.S. Tulga, 1979 (Civil and Environmental Engineering, MIT)
- J.L. Tassoulas, 1979 (Civil and Environmental Engineering, MIT)
- G.R. Whicher, 1979 (Civil and Environmental Engineering, MIT)
- S.D. Costello, 1980 (Civil and Environmental Engineering, MIT)
- P.J. Pike, 1980 (Civil and Environmental Engineering, MIT)
- Haghayeghi, 1981 (Civil and Environmental Engineering, MIT)
- O. Brayer, 1981 (Civil and Environmental Engineering, MIT)
- J.G. Zisman, 1982 (Civil and Environmental Engineering, MIT)
- J.J. Calvo, 1982 (Civil and Environmental Engineering, MIT)
- P. Balduman, 1983 (Civil and Environmental Engineering, MIT)
- J.I. Nemoto, 1984 (Civil and Environmental Engineering, MIT)
- M.K. Yau, 1984 (Civil and Environmental Engineering, MIT)
- N. Nakazawa, 1984 (Civil and Environmental Engineering, MIT)
- S.S. Shareef, 1984 (Civil and Environmental Engineering, MIT)
- J.J. Plaisance, 1985 (Civil and Environmental Engineering, MIT)
- R. Sacks, 1985 (Civil and Environmental Engineering, MIT)
- G. Busa, 1985 (Civil and Environmental Engineering, MIT)
- D. Shrestinian, 1985 (Civil and Environmental Engineering, MIT)
- F.S. Chehayeb, 1985 (Civil and Environmental Engineering, MIT)
- H. Hens, 1986 (Civil and Environmental Engineering, MIT)
- M. Ahdab, 1986 (Civil and Environmental Engineering, MIT)
- H. Maesaka, 1986 (Civil and Environmental Engineering, MIT)
- F. A. Kamar, 1987 (Civil and Environmental Engineering, MIT)
- P.C.H. Chi, 1987 (Civil and Environmental Engineering, MIT)
- G. Zahar, 1987 (Civil and Environmental Engineering, MIT)
- R. A. Moussa, 1987 (Civil and Environmental Engineering, MIT)
- N.T. Nguyen, 1988 (Civil and Environmental Engineering, MIT)
- A.D. Banki, 1988 (Civil and Environmental Engineering, MIT)
- Stippung, 1989 (Civil and Environmental Engineering, MIT)
- M. Beattie, 1989 (Civil and Environmental Engineering, MIT)
- S. Shin, 1990 (Civil and Environmental Engineering, MIT)
- M. Valle, 1991 (Civil and Environmental Engineering, MIT)
- Schwitter, 1991 (Civil and Environmental Engineering, MIT)
- Oumera, 1991 (Civil and Environmental Engineering, MIT)
- A.M. Ali, 1992 (Civil and Environmental Engineering, MIT)
- A.A. Shahbazker, 1993 (Civil and Environmental Engineering, MIT)
- Pandor, 1994 (Civil and Environmental Engineering, MIT)
- U. Trende, 1995 (Civil and Environmental Engineering, MIT)
- G.M. Okutan, 1995 (Civil and Environmental Engineering, MIT)
- Hearing, 1996 (Civil and Environmental Engineering, MIT)
- S. Shah, 1996 (Civil and Environmental Engineering, MIT)
- W. Vichit-Vadakan, 1997 (Civil and Environmental Engineering, MIT)
- Morin, 1997 (Civil and Environmental Engineering, MIT)
- J. Karam, 1997 (Civil and Environmental Engineering, MIT)

- O. Gunes, 1998 (Civil and Environmental Engineering, MIT)
- Chuang, 1998 (Civil and Environmental Engineering, MIT)
- Martinez, 1998 (Civil and Environmental Engineering, MIT)
- B. Ong, 1999 (Civil and Environmental Engineering, MIT)
- Ching, 2001 (Civil and Environmental Engineering, MIT)
- Karaca, 2002 (Civil and Environmental Engineering, MIT)
- J.A. Ortega, 2006 (Civil and Environmental Engineering, MIT)
- Menzin, 2006 (Civil and Environmental Engineering, MIT)
- Obatoyinbo, 2006 (Civil and Environmental Engineering, MIT)
- P.Dohenek, 2006 (Civil and Environmental Engineering, MIT)
- T.B. Denvaid Lau, 2009 (Civil and Environmental Engineering, MIT)
- Timothy Emge, 2012 (Civil and Environmental Engineering, MIT)
- Justin Chen, "Detection of defects in FRP-reinforced concrete with the acoustic-laser vibrometry method," 2013 (Civil and Environmental Engineering, MIT)
- James Long, "Automated Structural Damage Detection using One-Class Machine Learning," 2014 (Civil and Environmental Engineering, MIT)
- Steven Palkovic, "Development of a Portable Scratch Test Device for Probing Strength, Ductility and Structural Distress in Metal Materials," 2014 (Civil and Environmental Engineering, MIT)
- Murat Uzun, "Video based Structural Identification using Motion Magnification," 2017 (Civil and Environmental Engineering, MIT)

✓ **CONSULTING PROJECTS**

- National Aeronautics and Space Administration Marshall Space Flight Center, Technical Consulting, Huntsville, AL, Technical Advisor, 1972 - 1974
- Westinghouse Hanford Company, Technical Consulting, Richland WA, Consultant, 1973 - 1974
- Naval Ship Research and Development Center, Technical Consulting, Bethesda, MD, Consultant, 1973
- United Engineers and Construction, Technical Consulting, Philadelphia, PA, Consultant, 1973
- Kraftwerk Union Erlangen, Technical Consulting, Erlangen, West Germany, Consultant, 1974 - 1975
- Curtiss-Wright Corporation, Technical Consulting, Wood Ridge, NJ, Consultant, 1974 - 1975
- Exxon Production Research, Technical Consulting, Houston, TX, Consultant, 1974
- Power Reactor and Nuclear Fuel Development Corp, Technical Consulting, Tokyo Japan, Consultant, 1975 - 1975
- Peabody Construction Company, Technical Consulting, Cambridge, MA, Consultant, 1977
- Babcock & Wilcox Lynchburg Research Center, Technical Consulting, Lynchburg, VA, Consultant, 1977 - 1982
- Multisystems, Inc., Technical Consulting, Cambridge, MA, Consultant, 1978 -1979

- B&M Technological Services, Inc, Technical Consulting, Boston MA, Technical Advisor, 1979 - 1981
- National University of Cordoba, Argentina, South America, Technical Consulting, Technical Advisor, 1981
- Government of Guine Bissau, South Africa (through World Bank), Technical Consulting, Consultant, 1982 - 1983
- Ford Marrin Esposito & Witmeyer, Technical Consulting, New York, NY, Consultant, 1982
- CEMCOM Research Associates Inc, Technical Consulting, Prince Frederick, MD, Consultant, 1983
- Westinghouse Corporation, Synthetic Fuel Division, Technical Consulting, Pittsburgh, PA, Consultant, 1983
- CEMTECH Laboratories, Technical Consulting, Yorktown Heights, NY, Technical Advisor, 1986 - 1988
- Asahi Company, Technical Consulting, Tokyo Japan, Consultant, 1987 - 1987
- Irsid Laboratories, Technical Consulting, Paris, France, Technical Advisor, 1988 - 1991
- Integrated Engineering Design, Inc, Technical Consulting, Cambridge, MA, Technical Advisor, 1988 - 1991
- Shimizu Corporation, Technical Consulting, Tokyo Japan, Consultant, 1988 - 1988
- Radex Austria, Technical Consulting, Radenthein, Austria, Technical Advisor, 1989 - 1991
- Amoco Production Company, Technical Consulting, Houston, TX, Consultant, 1990 - 1991
- Comalco Research & Technology, Technical Consulting, Thomastown Victoria, Australia, Consultant, 1992 -1995
- New Jersey Steel Corporation, Technical Consulting Sayreville, NJ, Consultant, 1995 - 1995
- Lazarou Enterprises Pty. Ltd, Technical Consulting Victoria, Australia, Technical Advisor, 1997 - 1998
- Barrington Business & Engineering Group, Technical Consulting Boston Ma, Consultant, 1997 - 1997
- Ditek Earthquake Engineering and Technology, Technical Consulting, Istanbul, Turkey, Technical Advisor, 2000 - 2002
- Lazarou Enterprises Pty., Ltd, Victoria, Australia, Advisor, 2000
- Alpha International, Inc, Washington DC, Advisor, 2000
- Knorr Brake US / Knorr Bremse Germany, Technical Consulting Westminster, Maryland, Consultant, 2005
- Kuwait Institute for Scientific Research, development of Sustainability Center of Building Materials, and Infrastructures, Consulting, 2011 - 2012
- State of Florida Office of Public Counsel, delamination of nuclear containment structure for Crystal River Nuclear Plant Unit 3, Consultant, 2011 - 2012
- McDonough, Hacking, and Lavoie LLC, Boston MA, Consulting, 2015

✓ **PROFESSIONAL AFFILIATIONS**

- ASCE Committee 447, Finite Element, Member
- International Union of Research and Testing Lab for Materials and Structures (RILEM), Member
- Boston Society of Civil Engineers (BSCE), Member
- Transportation Research Board (TRB), Member
- American Concrete Institute (ACI), Fellow
- American Society for Civil Engineers (ASCE), Member
- Society of Experimental Mechanics (SEM), Member
- American Ceramic Society (ACS), Member
- International Association for Bridge and Structural Engineering (IABSE), Member
- International Institute for FRP, Construction (IIFC), Elected Member Construction (IIFC)

✓ **SELECTED MEDIA COVERAGE**

- Cities of the future may be built with locally available volcanic ash, **MIT News**, 2018
- Cities of the future could be built with concrete made from volcanic ash, **Newsweek**, 2018
- MIT Team Discovers Roman Secret of Volcanic Concrete to Build Future Cities, **Inverse Innovation**, 2018
- MIT students fortify concrete by adding recycled plastic, **MIT News**, 2017
- Students fortify concrete by adding recycled plastic, **Science Daily**, 2017
- MIT students fortify concrete through recycled plastic, **Architect Magazine**, 2017
- Using energy-based designs to enhance earthquake hazard resistance, **MIT News**, 2017
- With new model, buildings may ‘sense’ internal damage, **MIT News**, 2016
- MIT researchers make buildings smart enough to ‘sense’ internal damage over time, **Fox News**, 2016.
- Technique to monitor building ‘health’ utilizes ambient vibrations, **ASCE Civil Engineering Magazine**, Issue of February 2017.
- Intelligent building may ‘sense’ internal damage after earthquake, **Yahoo! News**, 2016.
- Buildings of future may ‘sense’ internal damage after earthquake, **Earthquake News**, 2016
- Intelligent building may sense internal damage after earthquake, **The Hans India**, 2016
- With New Model, Buildings May ‘Sense’ Internal Damage, **Science Newline Technology**, 2016
- The Science Looks at Smart Buildings, Really Smart Ones, **Searching For Ithaka**, 2016
- Digital Nervous System Would Let Buildings Detect Their Own Weaknesses, **Popular Mechanics**, 2016
- New smart buildings may sense internal damage in real time, **India Today**, 2016
- With New Computational Model, Buildings May “Sense” Internal Damage, **Tech Explorer**, 2016

- MIT researchers develop sensing system to spot structural weakness in buildings, **Construction Dive**, 2016
- MIT Monitors Building Health, **Durability + Design**, 2016
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