Huiming Yin, PhD,PE

Associate Professor
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1. Professional Experience

Associate Professor **January 2013 – Present**
Department of Civil Engineering and Engineering Mechanics, Columbia University
Assistant Professor **July 2008 – December, 2012**
Department of Civil Engineering and Engineering Mechanics, Columbia University
Civil Engineer **October 2006 – July 2008**
Transportation Laboratory, California Department of Transportation
Post-Doctoral Research Associate **August 2004 – September 2006**
Department of Civil and Environmental Engineering, University of Illinois
Software Engineer **October 1998 – July 1999**
Risk Electronic Science & Technology Co. Ltd., China

Professional Engineer (PE) of Civil Engineering Licensed in California since 2008

2. Education

Ph.D., Civil Engineering, The University of Iowa, Iowa City, Iowa, July 2004
Dissertation: Micromechanics-based magneto-elastic constitutive modeling of particulate composites.
Committee: L.Z. Sun (Advisor); J. Arora; J.S. Chen; J. Lu; G.H. Paulino; C.C. Swan

M.S., Solid Mechanics, Peking University, Beijing, China, July 1998
Thesis: A refined theory of transversely isotropic plates and the nonlinear finite element analysis.
Committee: M.Z. Wang (Advisor); K.F. Huang; W. Wang; J.K. Wu

B.S.E., Engineering Mechanics, Hohai University, Nanjing, China, July 1995

3. Areas of Research and Specialization

Theme: Modern structural materials and designs for energy efficient infrastructure

- **Engineered materials** for sustainable and energy efficient infrastructure
- **Sustainable Engineering and Materials Laboratory** of the Carleton Laboratory as a showpiece of the Civil Engineering Department and the Engineering School
- **Characterization, modeling and optimization** of structural material performance at both micro- and macro- levels for building envelopes and transportation systems
- **Efficiency, durability and fabrication** of material systems for transportation infrastructure through basic theoretical approaches and experimental verification

4. Recognition and Awards

NSF Career Award, NSF CMMI - Structural Materials and Mechanics, "Energy in sustainable infrastructure – multi-scale/physical approach to a novel hybrid solar roofing panel", 2010-2015.
The Second Best Scientific Paper for 2012 in the International Journal "Road Materials and Pavement Design" - H.M. Yin, B. Lai, Viscoelastic modeling and characterization of zeolite modified asphalt binder considering phase transformation and air void interaction, *Road Materials and Pavement Design*, 13, 279-299, 2012.
NSF Travel Grant, the Second International Congress on Sustainability Science and Engineering, 2011
Travel Grant, the Seventh World Congress on Computational Mechanics, 2006
Fellowship, the Eighth US National Congress on Computational Mechanics, 2005
Fellowship, the Seventh US National Congress on Computational Mechanics, 2003
Honorable Mention, James F. Jakobsen Graduate Forum, The University of Iowa, 2003
Second Prize, Challenge Cup Science and Technology Contest of Peking University, 1998
Meritorious, the Mathematical Contest in Modeling in USA, 1994

5. Teaching Experience

Undergraduate and Graduate Courses

2014, Fall: ENME 4113 – **Advanced Mechanics of Solids**
2014, Spring: ENME 4115 – **Micromechanics of Composite Materials**
2014, Spring: ENME 3121 – **Structural Analysis**
2013, Fall: ENME 4113 – **Advanced Mechanics of Solids**
2013, Spring: ENME 4115 – **Micromechanics of Composite Materials**
2012, Fall: CIEN 3127 – **Structural Design Projects**
2012, Fall: ENME 4113 – **Advanced Mechanics of Solids**
2012, Spring: ENME 3114 – **Experimental Mechanics of Materials**
2012, Spring: ENME 4115 – **Micromechanics of Composite Materials** (**New**)
2011, Fall: ENME 4113 – **Advance Mechanics of Solids**
2011, Spring: ENME 3114 – **Experimental Mechanics of Materials**
2010, Fall: ENME E4113 - **Advanced Mechanics of Solids**
2010, Spring: ENME 3114 – **Experimental Mechanics of Materials**
2009, Fall: ENME 3113 – **Mechanics of Solids**
2009, Fall: ENME E4113 - **Advanced Mechanics of Solids**
2009, Spring: ENME 3114 - **Experimental Mechanics of Materials**
2008, Fall: ENME E4113 - **Advanced Mechanics of Solids**
In addition, from Spring 2009 to Spring 2014, ~ 20 students have conducted 3-credit independent research classes with me for different research projects.

Completed PhD Advisees

Po-Hua Lee, Fabrication, characterization, and modeling of functionally graded materials, Columbia University (PhD: 2009 – 2013), now MedeonBio, Inc.

Pablo Prieto-Muñoz, Stress transfer and failure analysis of bi-layered material systems, Columbia University (PhD: 2009 – 2012), now UMT Consulting Group.

Post-Doc Advisees

Dajiang Yang, Hybrid solar panel for photovoltaic, thermoelectric and heat utilization, Columbia University (Post-Doc: 2010 – 2012), now OmniVision.
Fangliang Chen, Nondestructive test methods in civil engineering, Columbia University (Post-Doc: 2013 – present)

Current PhD Advisees

Siyu Zhu, Phase change and microstructural evolution of a multiphase fluid system, Columbia University, MS/PhD (2014 – present)
Xin He, Multiscale modeling and characterization of a building integrated photovoltaic thermal system, Columbia University, MS/PhD (2013 – present)
Gisele G. Ribeiro, Density measurement and modeling of pavement materials, Columbia University, co-advise with Prof. Hoe Ling (2013 –present).
Gan Song, Equivalent inclusion method and boundary element method for composite materials, Columbia University (2013 – present)
Lingqi Yang, Dissipative particle dynamical simulation for inelastic behavior of materials, Columbia University (2012 – present)
Sung-Hwan Jang, Characterization of ferromagnetic particulate nanocomposites for strain and fracture sensing, Columbia University (2011 – present)
Liang Wang, Dynamic routing and networking in a complex transportation system, Columbia University (2011- present)

Member of PhD Defense Committee (13 dissertations)

Minkyum Kim, UIUC, April 2009 (Advisor Buttlar)
N. Berk Hizir, Columbia University, October 2010 (Advisor Betti)
Kirubel Teferra, Columbia University, June 2011 (Advisor Deodatis)
Xueyu (Theo) Pang, Columbia University, September 2011 (Advisor Meyer)
Sergey Kuznetsov, Columbia University, January 2012 (Advisor Fish)
Ching Hung, Columbia University, December 2012 (Advisor Ling)
Mahesh Bailakanavar, Columbia University, April 2013 (Advisor Fish)
Daniel Hochstein, Columbia University, May 2013 (Advisor Meyer)
Xiaoqi Xu, Columbia University, June 2013 (Advisors Culligan, Taylor)
Colin McAuliffe, Columbia University, December 2013 (Advisor Waisman)
Edward Swanson, Columbia University, January 2014 (Advisor Park)
Tyler Carson, Columbia University, May 2014 (Advisor Culligan)
Jianqiang Wei, Columbia University, May 2014 (Advisor Meyer)

Other Advisees

High School Students

Christopher Chen, Open-Mode Integrated Transportation System (OMITS) 2011; Passive solar tracker system 2012 (Now undergraduate at Harvard University).
Jeffery Xie, Sedimentation of aluminum particles and high density polyethylene powder toward functionally graded material manufacturing 2013.

Undergraduate Students

Benjamin Lai, The road for sustainability - an investigation of the rheological behavior of asphalt binder modified by warm mix asphalt additives, Columbia University, 2009 (Now PhD student at MIT).

Valerie Gono, Study on the stress distribution of ceramic coated ductile metal with axisymmetry, Columbia University 2010 (Now graduate student at the University of Texas at Austin).

Alaa M. Saleh, Prototype preparation of hybrid solar roofing panels and the open-mode integrated transportation system, Columbia University 2010 (Now MS-PhD student at Imperial College, UK)

Steve Wong, Prototype preparation of hybrid solar roofing panels, Columbia University 2010 (Now Stanford University).

James Yang, Wear test of composite utility covers, Columbia University, 2011-12.

Luis A. Arias, Aviv S. Bridge, Vincent Nasri, Ethanol based foaming approach to sustainable asphalt pavements, Columbia University, 2012 (Now Luis and Vincent are graduate student at the University of Texas at Austin).

Master Graduate Students

Michael E. Lackey, Fabrication of hybrid solar roofing panel, Columbia University, 2010.

Zifeng Yuan, Green's function for functionally graded materials, Columbia University, 2010 (Now Columbia PhD candidate)

Adrian Wright, Fabrication of chain-structured invar silicone thin film for strain gages, Columbia University, 2010.

Yang Liu, Fracture testing and analysis of alumina-aluminum coating system, Columbia University, 2011 (Now Columbia PhD candidate)

Kritika Kaul, Development of the database for the open-mode integrated transportation system, Columbia University, 2011.

Carmen Marin, Solar photovoltaic cell market research, Columbia University, 2011.

Jen Park, Life cycle analysis of a building integrated photovoltaic thermal system, Columbia University, 2012-2013.

Paul Maurin, Blanche Luis, Test and demonstration of the open-mode integrated transportation system, Columbia University, 2012 (Intern Students, ENTPE, France).

Chia-Hong Wu, Thermal and thermomechanical characterization of aluminum and high density polyethylene functionally graded materials, Columbia University, 2013.

Lei Deng, Scale up the manufacturing of the building integrated solar roofing panel, Columbia University, 2013.

Yingjie Liu, Characterization and simulation of thermoelectric materials cross micro- and macro- levels, Columbia University, 2012 – 2013.

Visiting Scholars

Hua Zhang, (August 2011 – August 2012), Associate Professor in Hohai University, Fabrication and characterization of the strain gauges using magnetic particle filled polymer composites.

Yunjin Hu, (October 2012 – October 2013), Associate Professor in Zhejiang

University, Numerical simulation of fracture in layered material system.

Mingzheng Chen, (2013 – present), Associate Professor in Chongqing University of Science and Technology, Design and manufacture of the building integrated solar roofing panel.

Yingtao Zhao, (2014 – present), Lecturer in Beijing Institute of Technology, Micromechanics of composite materials.

5. Professional Services

Guest Editor for Journal

- Special issue: Mechanics of Nanocomposites and Nanostructures. 2013. Journal of Nanomechanics and Micromechanics, ASCE

Journal Reviewer

ASCE Journals (5): Journal for Materials in Civil Engineering, Journal of Engineering Mechanics, Journal of Geotechnical and Geoenvironmental Engineering, Journal of Nanomechanics and Micromechanics, Journal of Transportation Engineering

ASME Journals (3): Journal of Applied Mechanics, Journal of Engineering Materials and Technology, Journal of Biomechanical Engineering

Other mechanics Journals (8): Proceedings of the Royal Society A: Mathematical Physical & Engineering Sciences, Mechanics Research Communications, Mechanics of Materials, Acta Mechanica, Probabilistic Engineering Mechanics, International Journal for Structures and Solids, International Journal for Damage mechanics, Theoretical and Applied Fracture Mechanics

Other materials journals (8): Road Materials and Pavement Design, Construction and Building Materials, Computational Materials Science, Journal of Intelligent Material Systems and Structures, Composites Science and Technology, Composite Structures, Polymer, International Journal of Biological Macromolecules

Other engineering journals (13): International Journal for Numerical Methods in Engineering, Transportation Research Board, Automation in Construction, Advances in Structural Engineering, Journal of Scientific and Industrial Research, International Journal for Multiscale Computational Engineering, IEEE Transactions on Energy Conversion, Solar Energy, Applied Energy, ACI Structural Journal, International Journal of Medical Imaging, ASTM Journal of Testing and Evaluation, Journal of Robotics and Mechatronics Review

Mathematics and Science journal (2): Quarterly of Applied Mathematics, Science China

Book Reviewer

- Materials for Civil Engineers: Properties, Behavior and Sustainable Use

Research proposal/Project Reviewer **October 2006 – Present**

- FCT, I.P. - Fundação para a Ciência e Tecnologia
- TCRP Synthesis Panel SB-21
- RILEM TC-MCD TG-1 Panel - Cracking Mechanisms
- National Center for Metropolitan Transportation Research (METRANS) proposal reviewer
- NSF proposal/Panel reviewer

OISE - Collaborative Research (2 times)

CMMI – Structural Materials and Mechanics (3 times including a CAREER Panel)

CMMI – Mechanics of Materials (2 times)
CMMI – Sensors and Sensing Systems (1 times)
- Caltrans Reflective Cracking Study - conducted by UCPRC

Professional Committee Service

- Inelasticity Committee - EMI, ASCE, August, 2010 – present (**Chair**, 10/1/13- present)
- Nano-composite Committee - EMI, ASCE, August, 2010 – present
- Caltrans Standard Specification Section 88 Technical Working Group, April – August 2007
- F. N. Hveem Memorial Scholarship Committee, Caltrans, July 2007 – July 2008
- Nuclear Gauge Test Methods Technical Working Group, October 2006 – July 2008
- Caltrans Reference Sample Program, November 2006 – July 2008

University Committee Service

- Department Seminar co-organizer – CEEM, Columbia University, 2012 - present
- Faculty Search Committee – CEEM, Columbia University, 2013
- Graduate Committee – CEEM, Columbia University, August, 2011 – present
- Undergraduate Committee – CEEM, Columbia University, January, 2010 – August, 2011
- Faculty Search Committee – CEEM, Columbia University, 2010

Conference Service

- Conference symposium co-chair - ASCE EMI 2013 Conference, Northwestern University, August 4-7, 2013, Evanston, IL.
- Associate editor - 11th International Conference of Chinese Transportation Professionals, ICCTP 2011, August 14-17, Nanjing, China.
- Conference symposium co-chair - 48th SES Conference at Northwestern University, October 12-14, 2011, Evanston, IL.
- Symposium chair - 5th International Symposium on In-situ Rock Stress (ISRSV), August 25-27, 2010, Bejing, China.
- Symposium co-chair: Engineering Mechanics Institute 2010, August 8-11, 2010, Los Angeles, CA.
- Symposium chair: 4th Biot Conference on Poromechanics, June 8-10, 2009, New York, NY.

Professional Affiliations

American Society of Civil Engineering (ASCE)
Society of Engineering Science (SES)
United States Association for Computational Mechanics (USACM)
The International Association for Computational Mechanics (IACM)
Transportation Research Board (TRB)
Association of Asphalt Paving Technologists (AAPT)

6. Publications (Advisees of Dr. Yin are highlighted by bold font)

(a) Published Refereed Journal Papers

1. **Y.J. Liu**, H.M. Yin, Stress concentration of a micro-void embedded in an adhesive layer during stress transfer. *Journal of Engineering Mechanics - ASCE* (in press).

2. **L.Q. Yang**, H.M. Yin, Dissipative particle dynamics simulation towards single particle sedimentation. *Physical Review E* (in press).
3. **P.-H. Lee**, H.M. Yin, Experimental investigation and numerical simulation of aluminum particle sedimentation toward functionally graded material fabrication. *Journal of Nanomechanics and Micromechanics - ASCE* (in press).
4. H.M. Yin, **P.-H. Lee**, **Y.J. Liu**, Equivalent inclusion method for the Stokes flow of drops moving in a viscous fluid. *Journal of Applied Mechanics*, 81, 071010, 2014.
5. **Y.J. Liu**, H.M. Yin, Equivalent inclusion method based simulation of particle sedimentation toward functionally graded material manufacturing, *Acta Mechanica*, 225, 1429-1445, 2014.
6. **P.A. Priesto-Muñoz**, H.M. Yin, R. Testa, Mechanics of an adhesive anchor system subjected to a pullout load. Part I: elastic analysis. *Journal of Structural Engineering – ASCE*, 140, 04013052, 2014.
7. **P.A. Priesto-Muñoz**, H.M. Yin, R. Testa, Mechanics of an adhesive anchor system subjected to a pullout load. Part II: viscoelastic analysis. *Journal of Structural Engineering – ASCE*, 140, 04013053, 2014.
8. **P.-H. Lee**, M. Odlin, H.M. Yin, Hollow cylinder test for the young's modulus distribution and the ultimate strength of bamboo. *Construction and Building Materials*, 51, 235-243, 2014.
9. **Y.J. Liu,** H.M. Yin, Elastic thermal stress in hollow circular overlay/substrate system. *Mechanics Research Communications*, 55, 10-17, 2014.
10. **D.J. Yang**, C. Lu, H.M. Yin, and I.P. Herman, Thermoelectric performance of PbSe quantum dot films. *Nanoscale*, 5, 7290-6, 2013.
11. H.M. Yin, **P.A. Prieto-Muñoz**, Stress transfer through fully bonded interface of layered materials. *Mechanics of Materials*. 62, 69-79, 2013.
12. **P.A. Prieto-Muñoz**, H.M. Yin, W.G. Buttlar, Two dimensional stress analysis of low temperature cracking in asphalt overlay/substrate systems, *Journal of Materials in Civil Engineering – ASCE*, 25, 1228–1238, 2013.
13. H.M. Yin, **D.J. Yang**, G. Kelly, J. Garant, Design and performance of a novel building integrated PV/thermal system for energy efficiency of buildings, *Solar Energy*, 87, 184-195, 2013.
14. **D.J. Yang, Z.F. Yuan, P.H. Lee**, H.M. Yin, Simulation and experimental validation of heat transfer in a novel hybrid solar panel, *International Journal of Heat and Mass Transfer*, 55, 1076-1082, 2012.
15. H.M. Yin, **B. Lai**, Viscoelastic modeling and characterization of zeolite modified asphalt binder considering phase transformation and air void interaction, *Road Materials and Pavement Design*, 13, 279-299, 2012 (Awarded the 2nd Best Paper of the journal 2012 with a prize of Euro 1000).
16. **Z.F. Yuan**, H.M. Yin, Elastic thermal stresses in a circular overlay/rigid substrate system, *Mechanics Research Communication*, 38, 283-287, 2011.
17. **D.J. Yang**, H.M. Yin, Energy conversion efficiency of a novel hybrid solar system for photovoltaic, thermoelectric, and heat utilization, *IEEE Transaction of Energy Conversion*, 26, 662-670, 2011.
18. **Z.F. Yuan**, H.M. Yin, Elastic Green's functions for a specific graded material with a quadratic variation of elasticity. *Journal of Applied Mechanics*, 78, 021021, 2011.
19. H.M. Yin, Opening-mode cracking in asphalt pavements: crack initiation and saturation (invited), *Road Materials and Pavement Design*, 11, 435-457, 2010.

20. H.M. Yin, Comment on "influence of interfacial compliance on thermomechanical stresses in multilayered microelectronic packaging" (IEEE Trans. Adv. Packaging, 29, 666-673, 2006). *IEEE Transaction of Advanced Packaging*, 33, 353-355, 2010.
21. H.M. Yin, Fracture saturation and critical thickness in layered materials, *International Journal of Solids and Structures*, 47, 1007-1015, 2010.
22. H.M. Yin, Z.R. Luo, Investigation of the nuclear gauge density calibration method, *Road Materials and Pavement Design*, 10, 625-645, 2009.
23. Z.R. Luo, H.M. Yin, Probabilistic analysis of pavement distress ratings with the clusterwise regression method, *Transportation Research Board: Journal of the Transportation Research Board*. 2084/2008, 38-46, 2009.
24. H.M. Yin, G.H. Paulino, W.G. Buttlar, An explicit elastic solution for a brittle film with periodic crack. *International Journal of Fracture*. 153, 39-52, 2008.
25. H.M. Yin, G.H. Paulino, W.G. Buttlar, L.Z. Sun, Effective thermal conductivity of functionally graded particulate nanocomposites with interfacial thermal resistance, *Journal of Applied Mechanics*, 75, 051113, 2008.
26. H.M. Yin, G.H. Paulino, W.G. Buttlar, L.Z. Sun, Heat flux field for one inhomogeneity embedded in a functionally graded material, *International Journal of Heat and Mass Transfer*, 51, 3018-3024, 2008.
27. H.M. Yin, W.G. Buttlar, G.H. Paulino, H. Di Benedetto, Assessment of existing micromechanical models for asphalt mastics considering viscoelastic effects, *Road Materials and Pavement Design*, 9, 31-57, 2008.
28. H.M. Yin, G.H. Paulino, W.G. Buttlar, L.Z. Sun, Micromechanics-based thermoelastic model for functionally graded particulate materials with particle interactions, *Journal of the Mechanics and Physics of Solids*, 55, 132-160, 2007.
29. H.M. Yin, W.G. Buttlar, G.H. Paulino, Simplified solution for periodic thermal discontinuities in asphalt overlays bonded to rigid pavements, *Journal of Transportation Engineering – ASCE*, 133, 39-46, 2007.
30. H.M. Yin, L.Z. Sun, Magneto-elastic modeling of composites containing randomly dispersed ferromagnetic particles, *Philosophical Magazine*, 86, 4367-4395, 2006.
31. G.H. Paulino, H.M. Yin, L.Z. Sun, Micromechanics-based interfacial debonding model for functionally graded materials with particle interactions, *International Journal of Damage Mechanics*, 15, 267-288, 2006.
32. H.M. Yin, L.Z. Sun, Effective magnetic permeability of composites containing chain-structured particles, *Acta Materialia*, 54, 2317-2323, 2006.
33. H.M. Yin, L.Z. Sun, J.S. Chen, Magneto-elastic modeling of composites containing chain-structured magnetostrictive particles, *Journal of the Mechanics and Physics of Solids*, 54, 975-1003, 2006.
34. H.M. Yin, L.Z. Sun, Magneto-elasticity of chain-structured ferromagnetic composites, *Applied Physics Letters*, 86, 261901, 2005.
35. H.M. Yin, L.Z. Sun, Magnetic properties of randomly dispersed magnetic particulate composites: A theoretical study, *Physical Review B*, 72, 054409, 2005.
36. H.M. Yin, G.H. Paulino, W.G. Buttlar, L.Z. Sun, Effective thermal conductivity of functionally graded composites, *Journal of Applied Physics*, 98, 063704, 2005.
37. H.M. Yin, L.Z. Sun, Elastic modelling of periodic composites with particle interactions, *Philosophical Magazine Letters*, 85, 163-173, 2005.

38. H.M. Yin, L.Z. Sun, G.H. Paulino, A multiscale framework for elastic deformation of functionally graded composites, *Materials Science Forum*, 492-493, 391-396, 2005.
39. H.M. Yin, L.Z. Sun, G.H. Paulino, Micromechanics-based elastic modeling for functionally graded materials with particle interactions, *Acta Materialia*, 52, 3535-3543, 2004.
40. H. M. Yin, L. Z. Sun, G. Wang, M. W. Vannier, Modeling of elastic modulus evolution of cirrhotic human liver , *IEEE Transactions on Biomedical Engineering*, 51, 1854-1856, 2004.
41. H.M. Yin, L.Z. Sun, G. Wang, T. Yamada, J. Wang, M.W. Vannier, ImageParser: a tool for finite element generation from three-dimensional medical images, *BioMedical Engineering OnLine*, 3, 31, 2004.
42. H.M. Yin, L.Z. Sun, J.S. Chen, Micromechanics-based hyperelastic constitutive modeling of magnetostrictive particle-filled elastomers, *Mechanics of Materials*, 34, 505-516, 2002.
43. H.M. Yin, W. Wang, A refined theory of transversely isotropic plates. *Acta Scientiarum Naturalium Universitatis Pekinensis*, 37, 23-33, 2001.
44. H.M. Yin, M.Z. Wang, Stress functions in 2-dimensional, 3-dimensional, N-dimensional elasticity. *Acta Scientiarum Naturalium Universitatis Pekinensis*, 34, 21-26, 1998

(b) Submitted Journal Papers

1. **F.L. Chen, X. He, P.A. Priesto-Muñoz,** H.M. Yin, Experimental and theoretical investigation of fracture in alumina coating on an aluminum substrate. *International Journal of Plasticity* (Submitted).

(c) Journal Papers in Preparation

2. **S.-H. Jang**, H.M. Yin, Effective electrical conductivity of carbon nanotubes polymer composites: A simplified model and its validation, *Acta Materialia* (To be submitted).
3. **G. Song**, **L. Deng, L. Wang,** H.M. Yin, Constitutive modeling and experimental characterization of the lightweight concrete for solar roofing panels. *Mechanics of Materials*, (To be submitted).
4. **Y.J. Liu**, **G. Song**, H.M. Yin, Boundary effect on the elastic field and effective elasticity of a semi-infinite solid containing particles. *Journal of the Mechanics and Physics of Solids*, (To be submitted).
5. **L.Q. Yang,** H.M. Yin, Accelerated test of the creep behavior of an adhesive anchoring system. *Experimental Mechanics*, (To be submitted).
6. **G. Song, Y.J. Liu**, H.M. Yin, On a small particle moving in a bounded fluid. *Journal of Fluid Mechanics* (In preparation).
7. **G. Song,** H.M. Yin, Equivalent inclusion based boundary integral method for modeling a many-particle system. *Computer Methods in Applied Mechanics and Engineering*, (In preparation).
8. **G.G. Ribeiro,** H.M. Yin, Experimental characterization of ethanol based asphalt foaming process. *Road Materials and Pavement Design* (In preparation).

(d) Conference Presentations with Paper Proceedings

1. H.M. Yin, **L. Wang, P. Maurin**, H. Xu, 2013, Dynamic transit service through the open mode integrated transportation system. *TRB 92th Annual Meeting*, January 13-17, DC.

2. H.M. Yin, **D.J. Yang**, 2011, Energy conversion efficiency of a novel hybrid solar roofing panel. *2011 NSF Engineering Research and Innovation Conference – Energy for Sustainability and Prosperity*, January 4-7, Atlanta, GA.
3. H.M. Yin, **A.M. Saleh,** M.D. Shields, 2010, Design and payoff prediction for the open mode integrated transit system. *Transportation Research Board 90th Annual Meeting*, January 23-27, Washington DC.
4. **P.A. Prieto-Muñoz**, H.M. Yin, R. Testa, 2010, Elastic analysis of an adhesive anchor system towards strength and failure prediction, *9th World Congress on Computational Mechanics and 4th Asian Pacific Congress on Computational Mechanics*, July 19-23, Sydney, Australia.
5. H.M. Yin, R. Testa, 2009, Strength prediction for adhesive anchors: elastic analysis. *Department of Homeland Security Workshop on Aging Infrastructure*. July 21-23, New York, NY.
6. **B. Lai**, C. Barros, H.M. Yin, 2009, Investigation of rheological behavior of asphalt binder modified by the Advera® additive, *4th Biot Conference on Poromechanics*, p. 487-492, June 8-10, New York, NY.
7. H.M. Yin, G.H. Paulino, W.G. Buttlar, L.Z. Sun, 2008, Effective thermal conductivity of functionally graded particulate nanocomposites with interfacial thermal resistance, *AIP Conference Proceedings*, Multiscale and Functionally Graded Materials 2006, vol. 973, p. 321-326.
8. H.M. Yin, W.G. Buttlar, G.H. Paulino, H. Di Benedetto, 2006, Micromechanics-based model for asphalt mastics considering viscoelastic effects, *10th International Conference on Asphalt Pavements*. August 12-17, Québec, Canada.
9. H.M. Yin, W.G. Buttlar, G.H. Paulino, 2005, A two-dimensional elastic model of pavements with thermal failure discontinuities, *3rd MIT Conference on Computational Fluid and Solid Mechanics*, p. 539-542, June 14-17, Boston, MA.
10. H.M. Yin, L.Z. Sun, G.H. Paulino, 2004, Micromechanical modeling of functionally graded composites, *2004 ASME IMECE*, v 255, p.1-8, November 13-19, Anaheim, CA.
11. H.M. Yin, L.Z. Sun, 2004, Micromechanics-based magnetomechanical modeling of ferromagnetic-particle-reinforced active composites, *Proceedings of SPIE Smart Structures and Materials 2004 – Active Materials Behavior and Mechanics*, Ed: Lagoudas, D.C., vol. 5387, p. 72-83, March 15-18, San Diego, CA.
12. H.M. Yin, L.Z. Sun, 2003, Coupled Magneto-mechanical Modeling of Ferromagnetic Particle Reinforced Composites, *2003 MRS Fall Meeting*. vol. 785, p. 481-486, December 1-5, Boston, MA.
13. H. M. Yin, L. Z. Sun, G. Wang, M. W. Vannier, 2003, Modeling of elastic modulus evolution of cirrhotic human liver, *2003 MRS Fall Meeting*. p. 201-203, December 1-5, Boston, MA.

(e) Conference Presentations with Abstracts or Posters

14. Y. Chen, T.B. Zhao, **Y.T. Zhao**, H.M. Yin, Analytical polynomial stress functions of piezoelectric materials. *Proceedings of the ASME 2014 International Mechanical Engineering Congress & Exposition*, November 14-20, 2014, Montreal, Canada.
15. **G. Song, L. Wang, L. Deng**, H. M. Yin, Micromechanical characterization and modeling of lightweight concrete containing polymer foam particles. *13th International Symposium*

on Multiscale, Multifunctional and Functionally Graded Materials, October 19-22, 2014, Taua Resort, SP, Brazil.

16. **Y.J. Liu**, H. M. Yin, Simulation of many particles moving in a viscous fluid toward functionally graded material manufacturing. *13th International Symposium on Multiscale, Multifunctional and Functionally Graded Materials*, October 19-22, 2014, Taua Resort, SP, Brazil.
17. **F.L. Chen, X. He, M.Z. Chen**, H.M. Yin, Fabrication and characterization of functionally graded materials for multifunctional solar roofing panels, *13th International Symposium on Multiscale, Multifunctional and Functionally Graded Materials*, October 19-22, 2014, Taua Resort, SP, Brazil.
18. **Y.T. Zhao**, M.Z. Wang, H.M. Yin, Eshelby's Problem with Imperfect Interface. *Conference of the ASCE Engineering Mechanics Institute*, August 5 – 8, 2014 McMaster University, ON, Canada.
19. **S.H. Jung**, H.M. Yin, Characterization and modeling of effective electrical conductivity of carbon nanotubes filled polydimethylsiloxane composites. *Conference of the ASCE Engineering Mechanics Institute*, August 5 – 8, 2014 McMaster University, ON, Canada.
20. **F.L. Chen**, H.M. Yin, Opening-mode fracture of a brittle thin film bonded to an elastoplastic substrate. *Conference of the ASCE Engineering Mechanics Institute*, August 5 – 8, 2014 McMaster University, ON, Canada.
21. **G. Song**, H.M. Yin, Applications of equivalent inclusion method based boundary integration formulation in multiple potential problems. *Conference of the ASCE Engineering Mechanics Institute*, August 5 – 8, 2014 McMaster University, ON, Canada.
22. **Y.J. Liu**, H.M. Yin, Stress concentration of a micro-void embedded in an adhesive layer during stress transfer, *Conference of the ASCE Engineering Mechanics Institute*, August 5 – 8, 2014 McMaster University, ON, Canada.
23. **Y.J. Liu, Gan Song**, H.M. Yin, Boundary effect on the elastic field and effective elasticity of a semi-infinite solid containing particles, *Conference of the ASCE Engineering Mechanics Institute*, August 5 – 8, 2014 McMaster University, ON, Canada.
24. **L.Q. Yang**, H.M. Yin, Particle dynamics simulation of particle sedimentation toward functionally graded material fabrication. *Conference of the ASCE Engineering Mechanics Institute*, August 5 – 8, 2014 McMaster University, ON, Canada (***First Prize*** *in Conference Student Poster Competition*).
25. **Y.J. Liu, Gan Song**, H.M. Yin, Boundary effect on the elastic field of a semi-infinite solid containing particles, *11th World Congress on Computational Mechanics* (*WCCM XI*), July 20 - 25, 2014, Barcelona, Spain.
26. H.M. Yin, R. Testa, R. Betti, M. Feng, A multifunctional weathering system for life cycle performance investigation of emerging polymer materials and structures, *ONR Program Review Meeting - High Strain Rate Elastomeric Polymers for Protection BRC-Polymers-by-Design & Shockwave Mitigation mTBI*, October 29-31, 2013, Washington, DC.
27. **L.Q. Yang, Y.J. Liu, P.-H. Lee**, H.M. Yin, 2013, Dissipative particle dynamics simulation of particle sedimentation toward functionally graded material fabrication, *Engineering Mechanics Institute 2013*, August 4-7, Chicago, IL.
28. **L.Q. Yang, P.A. Prieto-Muñoz,** H.M. Yin, 2013**,** Characterization of the creep behavior of an adhesive anchor system, *Engineering Mechanics Institute 2013*, August 4-7, Chicago, IL.
29. **Y.J. Liu, P.-H. Lee,** H.M. Yin, 2013, Solution of Spherical Drops Moving in a Different

Fluid with a No-Slip Interface, *Engineering Mechanics Institute 2013*, August 4-7, Chicago, IL.

30. **S.-H. Jang**, H.M. Yin, 2013, Modeling and characterization of graphene nanoplatelet/carbon nanotube (GNP/CNT) modified polymer for strain sensing, *Engineering Mechanics Institute 2013*, August 4-7, Chicago, IL.
31. H.M. Yin, **Y.J. Liu, P.-H. Lee**, 2013, Equivalent inclusion method based simulation of the sedimentation of many particles toward functionally graded material manufacturing, *SES 50th Annual Technical Meeting and ASME-AMD Annual Summer Meeting*. July 28 - 31, 2013, Providence, RI 02912.
32. **Y.J. Liu,** H.M. Yin, 2013, Numerical simulation and modeling of fracture pattern evolution in asphalt overlay/substrate systems at low temperatures, *12th U.S. National Congress on Computational Mechanics*. July 22-25, Raleigh, NC.
33. H.M. Yin, **Y.J. Liu, P.-H. Lee**, 2013, Simulation of many spherical particles moving in a newtonian fluid using the equivalent inclusion method, *12th U.S. National Congress on Computational Mechanics*. July 22-25, Raleigh, NC.
34. **L.Q. Yang, Y.J. Liu, P.-H. Lee**, H.M. Yin, 2013, Dissipative particle dynamics simulation of particle sedimentation toward functionally graded material fabrication, *12th U.S. National Congress on Computational Mechanics*. July 22-25, Raleigh, NC.
35. H.M. Yin, 2012, CMMI 0954717: CAREER: Energy in Sustainable Infrastructure – Multi-scale/physical Approach to a Novel Hybrid Solar Roofing Panel, *CMMI 2012 NSF Engineering Research and Innovation Conference*, July 9-12, Boston, MA.
36. H.M. Yin, **P.A. Prieto-Muñoz**, 2012, Experimental and theoretical study of fracture pattern in a coating system, *Engineering Mechanics Institute 2012*, June 17-20, South Bend, IN.
37. **P.-H Lee**, H.M. Yin, 2012, Design and fabrication and design of Al-HDPE system functionally gradient graded materials, *Engineering Mechanics Institute 2012*, June 17-20, South Bend, IN.
38. **S.H. Jang**, **H. Zhang**, H.M. Yin, 2012, Fabrication and characterization of chain-structured ferromagnetic polymer film for strain sensing, *Engineering Mechanics Institute 2012*, June 17-20, South Bend, IN. (***Second Prize*** *in Experimental Analysis & Instrumentation Poster Competition*).
39. H.M. Yin, **P.A. Prieto-Muñoz**, 2011, Stress Transfer in Fully Bonded Multilayered Materials, *48th SES Conference at Northwestern University*, October 12-14, 2011, Chicago, IL.
40. H.M. Yin, **D.J. Yang, P.H. Lee, Z.F. Yuan**, 2011, Simulation and experimental validation of heat transfer in a novel hybrid solar panel, *48th SES Conference at Northwestern University*, October 12-14, 2011, Chicago, IL.
41. H.M. Yin, 2011, A novel building integrated photovoltaic thermal system, *6th Annual New Energy Symposium*, August 1, 2011, New York Academy of Sciences, New York, NY.
42. H.M. Yin, **P.A. Prieto-Muñoz, V. Gono**, Fracture and failure of a coated wire subject to a tension. *Engineering Mechanics Institute 2011*, June 2-4, Boston, MA.
43. H.M. Yin, **P.A. Prieto-Muñoz**, Low temperature cracking of asphalt pavements: fracture initiation and saturation. *Engineering Mechanics Institute 2011*, June 2-4, Boston, MA.
44. **P.A. Prieto-Muñoz**, H.M. Yin, Fracture Spacing in Layered Rocks: an analytical explanation based on elastic boundary-value problems. *Engineering Mechanics Institute 2011*, June 2-4, Boston, MA.

45. **P.-H Lee**, H.M. Yin, 2011, Hollow cylinder test for the Young's modulus distribution and the ultimate strength of bamboo, *Engineering Mechanics Institute 2011*, June 2-4, Boston, MA.
46. H.M. Yin, **D.J. Yang**, 2011, Design and Development of a Multifunctional Hybrid Solar Roofing Panel, *Second International Congress on Sustainability Science and Engineering*, January 9-12, 2011, Tucson, AZ.
47. H.M. Yin, Hybrid Solar Roofing Panels - Multifunctional Envelope for Green Buildings, Columbia Energy Symposium – 2030: An Energy Odyssey, April 9 2010, Low Library, Columbia University.
48. H.M. Yin, **P.A. Prieto-Muñoz**, H.Q. Xu, 2010, Fracture initiation and saturation in layered rocks: an elastic analysis, *5th International Symposium on In-situ Rock Stress (ISRSV)*, August 25-27, Bejing, China.
49. **Z.F. Yuan**, H.M. Yin, 2010, Elastic thermal stresses in a circular overlay/rigid substrate system, *9th World Congress on Computational Mechanics and 4th Asian Pacific Congress on Computational Mechanics*, July 19-23, Sydney, Australia.
50. H.M. Yin, **B. Lai**, 2010, Rheological testing and modeling of zeolite modified asphalt binder considering phase transformation and air void interaction, *Engineering Mechanics Institute 2010*, August 8-11, Los Angeles, CA.
51. **Z.F. Yuan**, H.M. Yin, 2009, Elastic Green's function for a graded material with quadratic material variation, *10th U.S. National Congress on Computational Mechanics*. July 16-19, Columbus, OH.
52. H.M. Yin, Z.R. Luo, 2009, Investigation of the nuclear gauge density calibration method, *The 2009 Joint ASCE-ASME-SES Conference on Mechanics and Materials*, June 24-27, Blacksburg, VA.
53. H.M. Yin, 2009, Opening-mode cracking in asphalt pavements: crack initiation and saturation, *10th U.S. National Congress on Computational Mechanics*. July 16-19, Columbus, OH.
54. H.M. Yin, W.G. Buttlar, G.H. Paulino, 2008, Low temperature cracking in asphalt overlays bonded to rigid pavements, *6th RILEM International Conference on Cracking in Pavements.* June 16-18, Chicago, IL.
55. C. B. Barros, H.M. Yin, J.T. Harvey, 2007, Investigations of warm mix asphalt technology by the California Department of Transportation, *9th U.S. National Congress on Computational Mechanics*. July 23-27, San Francisco, CA.
56. H.M. Yin, L.Z. Sun, 2007, Magneto-mechanical coupling of smart composites with chain-structured magnetostrictive particles, *World Forum on Smart Materials and Smart Structures Technology*. May 22-27, Chongqing & Nanjing, China.
57. H.M. Yin, L.Z. Sun, 2007, Magneto-elastic modeling of composites with chain-structured magnetostrictive particles, *SPIE Smart Structures and Materials & Nondestructive Evaluation and Health Monitoring*, March 18-22, San Diego, CA
58. H.M. Yin, G.H. Paulino, W.G. Buttlar, L.Z. Sun, 2006, Effective thermal conductivity of graded nanocomposites with interfacial thermal resistance, *7th World Congress on Computational Mechanics*. July 16 - 22, Los Angeles, California.
59. H.M. Yin, L.Z. Sun, 2006, Magneto-elastic modeling of composites with chain-structured magnetostrictive particles, *15th U.S. National Congress of Theoretical and Applied Mechanics*. June 25-30, Boulder, Colorado.

60. H.M. Yin, W.G. Buttlar, G.H. Paulino, 2005, Investigation of low temperature cracking in asphalt pavements, *8th U.S. National Congress on Comp. Mech.*. July 24-28, Austin, TX.
61. H.M. Yin, G.H. Paulino, W.G. Buttlar, 2005, Effective thermal conductivity of graded particulate composites, *8th U.S. National Congress on Comp. Mech*. July 24-28, Austin, TX.
62. L.Z. Sun, H.M. Yin, G.H. Paulino, 2004, Micromechanics-based elastic model for functionally graded materials with particle interactions, *Proceedings of the 21st International Congress of Theoretical and Applied Mechanics*, August 15-21, 2004, Warsaw, Poland.
63. H.M. Yin, L.Z. Sun, G.H. Paulino, 2004, Micromechanics-based elastic model for functionally graded composites with particle interactions, *8th International Symposium on Multifunctional and Functionally Grade Materials*, July 11-14, Leuven, Belgium.
64. H.M. Yin, L.Z. Sun, G.H. Paulino, 2003, Micromechanics-Based Elastic Model for Functionally Graded Composites, *40th Annual Technical Meeting of the Society of Engineering Science*. (CD-ROM), #8-10, October 12-15, Ann Arbor, MI.
65. H.M. Yin, L.Z. Sun, 2003, Coupled Magneto-mechanical Modeling of Ferromagnetic Particle Reinforced Composites, *40th Annual Technical Meeting of the Society of Engineering Science*. (CD-ROM), #10-3, October 12-15, Ann Arbor, MI.
66. H.M. Yin, L.Z. Sun, G.H. Paulino, 2003, Micromechanics-based elastic model for functionally graded composites with particle interactions, Abstract book of *7th U.S. National Congress on Computational Mechanics*. p. 802, July 27-31, Albuquerque, NM.
67. H.M. Yin, L.Z. Sun, J.S. Chen, 2002, Hyperelasticity of magnetostrictive particle-filled elastomers, Contemporary Research in Theoretical and Applied Mechanics - *14th US National Congress of Theoretical and Applied Mechanics*, Ed: Batra, R.C. and Henneke, E.G., p. 347, June 23-28, Virginia Polytechnic Institute and State University, Blacksburg, VA.
68. H.M. Yin, L.Z. Sun, J.S. Chen, 2001, Micromechanics-based constitutive modeling of magnetostrictive particle-reinforced elastomers, Proceedings of the 6th U.S. National Congress on Computational Mechanics, p. 234, July 31 - August 4, Dearborn, MI.
69. H.M. Yin, L.Z. Sun, J.S. Chen, 2001, Effective hyperelasticity of magnetorheological elastomers: a micromechanical framework, Proceedings of the 2001 ASME/ASCE/SES Mechanics and Materials Summer Conference, Ed: Nemat-Nasser, S., p. 60, June 27-29, San Diego, CA.

(f) Invited Seminar Presentations

1. H.M. Yin, Design, Functionally Graded Material Manufacturing and Modeling for Energy Efficient Building Envelope, October 23, 2014 (Scheduled), University of Sao Paulo, Brazil.
2. H.M. Yin, Toward Functionally Graded Materials Manufacturing for Energy Efficient Building Envelope, February 7, 2014, Department Seminar, Department of Mechanical Engineering, Columbia University.
3. H.M. Yin, Experiment and Modeling of Particle Sedimentation Towards FGM Manufacturing for Energy Efficient Building Envelope, October 28, 2013, SEMM Seminar, Department of Civil and Environmental Engineering, University of California, Berkeley.

4. H.M. Yin, Design, Fabrication and Modeling of a Hybrid Solar Roofing Panel for Energy Efficient Buildings, April 12, 2013, Mechanics Seminar, Department of Civil and Environmental Engineering, Carnegie Mellon University.
5. H.M. Yin, Mechanics of Low Temperature Cracking in Asphalt Pavements, May 7, 2012, Department of Civil and Environmental Engineering, University of Illinois at Urbana-Champaign.
6. H.M. Yin, Life Cycle Analysis of a Building Integrated Hybrid Solar Roofing System, April 26, 2011, PhD Seminar, School of Building Construction, Georgia Institute of Technology.
7. H.M. Yin, Design and Analysis of a Building Integrated Hybrid Solar Roofing Panel, March 30, 2011, Department of Civil and Environmental Engineering, Rutgers University.
8. H.M. Yin, Multifunctional Envelope for Energy Efficient and Sustainable Buildings, November 4, 2010, Department of Mechanical Engineering, The City College of New York.
9. H.M. Yin, Design, Fabrication, and Modeling of Hybrid Solar Roofing Panel, August 24 2010, Department of Mechanics and Aerospace Engineering, Peking University, China.
10. H.M. Yin, Design, Fabrication, and Modeling of Multifunctional Envelope for Energy Efficient and Sustainable Buildings, March 11 2010, Department of Civil & Environmental Engineering, University of California, Irvine.

(g) Pending Patent Applications

1. H.M. Yin, Strain gauge and fracture indicator based on composite film including chain-structured magnetically active particles.
   Invention report #M09-036 submitted: 10/27/2008
   Provisional patent approved by CTV and disclosed to patent office: 12/30/2008
   Publication # US20100154556 A; Application # US 12/646,098.
2. H.M. Yin, L.M. Li, **P. Prieto-Muñoz, M. Lackey**, Functionally Graded Solar Roofing Panels and Systems.
   Invention report # M09-091 submitted: 5/12/2009
   Invention report # M10-019 submitted: 8/11/2009
   Provisional patent approved by CTV and disclosed to patent office: 11/3/2009
   Publication # US20120097217 A1 & WO2010132868 A1; Application # US 13/320,044 & PCT/US2010/035066
3. H.M. Yin, J. Chen, Building integrated solar heating, power, and energy storage system.
   Invention Report M10-062 submitted: 2/9/2010
   Provisional patent approved by CTV and disclosed to patent office: 3/24/2010
   Publication # US20110253126 A1; Application # US 13/088,111
4. H.M. Yin, Design and method of a sustainable transportation system - sun tunnel
   Invention report # M10-096 submitted: 5/4/2010
   Provisional patent approved by CTV and disclosed to patent office: 6/29/2010
5. H.M. Yin, Open-Mode Integrated Transportation System (OMITS)
   Invention report # M11-099 submitted: 5/12/2011
   Provisional patent approved by CTV and disclosed to patent office: 7/14/2011

6. H.M. Yin and **D.J. Yang**, Design and Manufacture of Quantum Dot Thermoelectric Generator using Cold Spray Method
   Invention report # CU12047 submitted: 8/16/2011
   Provisional patent approved by CTV and disclosed to patent office: 11/3/2011.
7. H.M. Yin, **L.M. Li, C. Chen, and P.-H. Lee**, Passive Solar Tracker Using Thermal Expansion and Shifting of Weight
   Invention report # CU13352 submitted: 6/12/2013
   Provisional patent approved by CTV and disclosed to patent office: 10/15/2013.
8. H.M. Yin, **P.-H. Lee, V. Nasri, and L. Arias**, Process and System for Production of Ethanol Based Warm Foam Mix Asphalt
   Invention report # CU13364 submitted: 6/18/2013
   Provisional patent approved by CTV and disclosed to patent office: 9/17/2013.

(h) Book or Book Chapter

1. H.M. Yin, L.Z. Sun, **H. Zhang**, Micromechanics-based constitutive modeling of chain structured ferromagnetic particle reinforced composites, in Handbook Micromechanics and Nanomechanics, editors, Shaofan Li and Xin-Lin Gao, Pan Stanford Publishing, Taylor & Francis, 2013.
2. H.M. Yin, **D.J. Yang**, **F.L. Chen**, Application of silicon photovoltaic solar cells, (submitted).
3. H.M. Yin, **Y. T. Zhao**, Introduction to Micromechanics of Composite Materials, CRC Press and Spon Press (imprints of Taylor & Francis Group, Catalog #K24880 ISBN: 978-1-4987-0728-2.

7. Funded Research Projects

Completed projects:

1. **Investigation of rheological behavior of asphalt binder modified by warm mix asphalt additives,** H.M. Yin, the University Transportation Research Center – Department of Transportation, $5000, 1/1/2009-12/31/2009.
2. **Integrated sustainable policy economic model (ISPEM)**, R. Betti (PI), N. Charia, H. Waisman, H.M. Yin, Research Initiatives for Science and Engineering (RISE) at Columbia University, $16,000, 7/1/2009-6/30/2010.
3. **Integrated investigation of polyurea coatings for infrastructure protection**, H. Waisman (PI), R. Betti, H.M. Yin, and G. Deodatis, Department of Homeland Security, DHS CU09-1155, $659,018, 5/31/2010-5/30/2013.
4. **DOE STTR Phase I: Hybrid building integrated solar energy system for photovoltaic, thermoelectric and heat utilization**, H.M. Yin (PI), WAI, Department of Energy, DE-SC0003347, $165,000 (Including $15,000 from NYSERDA), 1/1/2010-6/30/2010.
5. **Prototype development of the open mode integrated transit system,** H.M. Yin, the University Transportation Research Center – Department of Transportation, $6000, 4/1/2011-3/31/2012.
6. **REU Supplemental fund to CAREER: Energy in sustainable infrastructure – multi-**

scale/physical approach to a novel hybrid solar roofing panel, H.M. Yin, National Science Foundation, CMMI 0954717, $6,000, 5/1/2013-8/31/2013.

7. **Wear testing using roadway loading parameters**, R.B. Testa, A. Brügger, H.M. Yin, Con Edison Company of New York, Inc., $400,000, 10/01/2010-9/30/2013.
8. **Social network based dynamic transit service through the OMITS system,** H.M. Yin, the University Transportation Research Center Region II – Department of Transportation, $50,000 (plus a $50,000 cost share), 1/1/2013-12/31/2013.
9. **Supplement Request for a QUV/Spray Chamber - SusChEM/Collaborative Research: Fundamental Understanding of Foaming Process towards a New Warm Mix Asphalt Technology,** H.M. Yin (PI), National Science Foundation, CMMI 1301160, $16,155, 8/1/2014-8/31/2014.

Ongoing projects:

10. **CAREER: Energy in sustainable infrastructure – multi-scale/physical approach to a novel hybrid solar roofing panel**, H.M. Yin, National Science Foundation, CMMI 0954717, $400,897, 7/1/2010-6/31/2015.
11. **Chain-Structured Strain and Fracture Sensor for Bridge Structural Health Monitoring**, H.M. Yin (PI), A. Smyth, and W. Bailey, National Science Foundation, CMMI 1301288**,** $333,112, 7/1/2013-6/30/2016.
12. **SusChEM/Collaborative Research: Fundamental Understanding of Foaming Process towards a New Warm Mix Asphalt Technology**, H.M. Yin (PI), National Science Foundation, CMMI 1301160, $270,000, 9/1/2013-8/31/2016. (Collaborated with Michigan Technological University at their budget of $200,000).
13. **DURIP – Multifunctional Weathering System for Life Cycle Performance Investigation of Emerging Polymer Materials and Structures**, H.M. Yin (PI), R. Testa, R. Betti, and M. Feng, Office of Naval Research, $628,565, 6/28/2013-6/27/2015.
14. **Alternatives to Nuclear Density Testing**, H.M. Yin (co-PI with Rowan University and Advanced Infrastructure Design, Inc.), New Jersey Department of Transportation, $449,980 (Yin's expense $122,595), 9/1/2013-8/31/2015.
15. **Characterization and Modeling of Photon Absorption in Asphalt Material for Improved Accuracy and Consistency of Nuclear Density Measurement**, H.M. Yin (PI), Q. Wang, H. Ling, and W.Z. Feng, the University Transportation Research Center Region II – Department of Transportation, $80,000 (plus $80,372 cost sharing). 3/1/2014 – 5/31/2015.
16. **Environmental Impacts of RAP**, H.M. Yin (co-PI with Lamont Campus of Columbia, Rowan University, and Stony Brook University), New Jersey Department of Transportation, $488,000 (Yin's expense $100,835), under contract, 4/1/2014-3/31/2016.
17. **AFOSR STTR Phase I: STTR: Particulate Composite Mixing Processes**, H.M. Yin (PI), F.L. Chen, J. Lua (Global Engineering and Materials, Inc.), Air Force Office of Scientific Research, $150,000 (Yin's Expense $55,360), 9/01/14-5/31/15.

In addition, Dr. Yin thanks the generous gift from the Weitzner family to the "**Henry Mitchell Weitzner Research Fund**" of $945,000, which has been and will be used for the research in solar energy and green technologies.

Pending proposals:

1. **Sustainability Research Network (SRN): Modern Infrastructural Materials and Design (MIMD) Network**. H.M. Yin (PI), I.P. Herman, K. Ford, J.M. Qu, and Y. Wang, National Science Foundation, $12M, 09/15/14-09/14/19.
2. **NSF SBIR Phase I: Sustainable manufacturing of a building integrated photovoltaic thermal panel**. D. Hochstein (PI- Empire Clean Energy Supply), H.M. Yin, F.L. Chen, National Science Foundation, $150,000 (Yin's Expense $49,999), 01/01/15-6/30/15
3. **NSF STTR Phase I: Smart Repair Methodology with a Crack Growth Sensor for Structural Components**, P. Woelke (PI - Weidlinger Associates, Inc), H.M. Yin, F.L. Chen, National Science Foundation, $225,000 (Yin's Expense $97,496), 01/01/15-6/30/15.
4. **Ethanol-Based Foaming Technology for Warm Mix Asphalt Pavements**, H.M. Yin (PI), B.Z. Yan, Z.P. You, P. Heiden, Y. Mehta, H. Di Benedetto, N. Kringos, G. Tebaldi, ERA-NET Plus Infravation European Commission, 1.5M Euro (~$2.025M), (Yin's Expense $686,894), 09/01/15-02/28/18.
5. **I/UCRC Planning Grant: Energy in Urban Transportation System (EiUTS)**, H.M. Yin (PI), D. King, M. Feng, National Science Foundation, $16,300, 01/01/15-6/30/15.

8. Major Media Coverage

1. **Scientific American**, Larry Greenemeier, Hybrid Solar Panels Combine Photovoltaics with Thermoelectricity, http://www.scientificamerican.com/article.cfm?id=hybrid-solar-panels, 12/30/2009.
2. **Solar Thermal Magazine**, Columbia University Developing Hybrid Integrated Solar Energy System, http://www.solarthermalmagazine.com/columbia-university-developing-hybrid-integrated-solar-energy-system/, 1/1/2010.
3. **TechPulse360**, Mark Boslet, Columbia University Builds Hybrid Solar Cell, http://techpulse360.com/2010/01/05/columbia-university-builds-hybrid-solar-cell. 1/5/2010.
4. **ASCE Civil Engineering Magazine**, Nancy Pontius, Integrated Solar Panel Generates Electricity and Heats Water, February 2010, Pages 38-39.
5. **Columbia Spectator**, Chris Crawford, Columbia professor's work to improve hybrid solar cells, February 24, 2010.
6. **The Christian Science Monitor**, Matthew Kahn, Hybrid Solar Cells: How university research causes 'green' innovation, February 25, 2010.
7. **Big Think.** Big Think Delphi Fellows. http://bigthink.com/users/huimingying.