

**Krishan Kumar Bhatia, Ph.D.**  
**Assistant Professor of Mechanical Engineering**  
**Rowan University**  
201 Mullica Hill Road  
Glassboro, NJ 08028  
(856)256-5346  
bhatia@rowan.edu

**Research Interests:**

Fuel Cells, Hybrid-Electric Vehicles, Vehicle Dynamics, Automotive Engineering, Clean Energy

**Education:**

08/00-08/04 Pennsylvania State University, Mechanical and Nuclear Engineering  
Ph.D., 2004; M.S., 2003  
Advisor: Dr. Chao-Yang Wang  
Ph.D. Thesis: *Study of a Methanol Reforming Polymer Electrolyte Fuel Cell System*

09/96-05/00 University of Delaware, Mechanical Engineering, B.M.E.

**Experience:**

01/05-Date Assistant Professor of Mechanical Engineering  
Rowan University, Glassboro, New Jersey

09/04-01/05 Post-Doctoral Fellow  
University of Delaware, Mechanical Engineering  
Advisors: Dr. Ajay Prasad and Dr. Suresh Advani

08/00-08/04 Graduate Research Assistant, Electrochemical Engine Center, Penn State Univ.

08/00-08/03 National Science Foundation M<sup>3</sup> Fellow

12/99-05/00 Undergraduate Research Assistant  
University of Delaware, Department of Mechanical Engineering  
Advisor: Dr. Hai Wang

05/99-09/99 Materials Engineering Intern, Boeing Inc.

05/98-09/98 Engineering Intern, W. L. Gore and Associates

09/97-12/99 Teaching Assistant for EGGG132, Engineering Graphics, University of Delaware

**University Teaching Experience:**

Advanced Heat Transfer (S07, F08)	Heat Transfer (S06, S07)
Automotive Engineering (S06, S09)	Junior/Senior Engineering Clinic (S05, F05, S06, F06, S07, F07, S08, F08, S09)
Emerging Topics in Mech. Eng. (S08, S09)	Sophomore Engineering Clinic I (F08)
Fluid Mechanics I (S05)	Sophomore Engineering Clinic II (S08, S09)
Fluid Mechanics II (S05)	Thermodynamics I (F05, F07)
Freshmen Engineering Clinic I (F06)	Thermodynamics II (F05, F07)
Freshmen Engineering Clinic II (S05)	

**Awards, Scholarships, and Fellowships:**

Gabron Graduate Fellowship in Mechanical Engineering  
NSF M<sup>3</sup> Hybrid Electric Vehicle Education Fellowship  
Penn State University College of Engineering Dean's Fellowship  
Penn State University Graduate Fellowship  
The Boeing Scholarship  
University of Delaware College of Engineering Scholarship

**Current and Completed Funding (~\$821,000 total) :**

New Jersey Department of Military and Veteran Affairs, *Analysis of Winds at Heights Greater Than 30m in Seagirt, NJ*, W. Riddell, K. Bhatia, and P. Jansson, 06/08 – 06/09

New Jersey Department of Military and Veteran Affairs, *Analysis of Winds at 30m Height in Seagirt, NJ*, W. Riddell, K. Bhatia, and P. Jansson, 06/08 – 06/09

New Jersey Clean Energy Program, *Removing Barriers to Entry: NJCEP Wind and Energy Efficiency Outreach & Education*, W. Riddell, K. Bhatia, and P. Jansson, 09/08 – 09/09

Atlantic County Utility Authority, *ACUA Geo and Operations Building Energy Audit*, J. Everet, K. Bhatia, P. Jansson, and W. Riddell, 01/08 – 08/08

New Jersey Clean Energy Program, *Wind Powering America, New Jersey State Outreach*, K. Bhatia, P. Jansson, and W. Riddell, 01/08 – 01/09

New Jersey Department of Environmental Protection, *Biodiesel Home Heating Oil Blends Emissions Characterization*, K. Bhatia, A. Marchese, and R. Hesketh, \$100,000, 09/07 – 09/08

Inductotherm Inc., *Financial Support for 2007 Rowan Mini-Baja Team*, E. Constans and K. Bhatia, 09/06 – 05/07

New Jersey Department of Environmental Protection, *Demonstration of Emissions Reduction Using Biodiesel/ULSD Blends in Airport Ground Support Equipment*, K. Bhatia, A. Marchese, and R. Hesketh, 06/07 – 09/08

New Jersey Higher Education Partnership for Sustainability, *Measurement and Reduction of On-Campus Student Greenhouse Gas Footprint*, K. Bhatia and W. Riddell, 06/07 – 12/07

New Jersey Department of Environmental Protection, *Evaluation of Emissions and Performance of NJ TRANSIT Diesel Locomotives with B20 Biodiesel Blends: Static and Mobile Testing*, A. Marchese, K. Bhatia, and R. Hesketh, 09/06 – 08/07

New Jersey Clean Energy Program, *Removing Barriers to Entry: NJCEP Wind and Energy Efficiency Outreach & Education*, P. Jansson, K. Bhatia, and W. Riddell, 07/06 – 06/07

New Jersey Department of Environmental Protection, *In-Cabin Particulate Matter Quantification and Reduction Strategies*, R. Hesketh, K. Bhatia, and A. Marchese, 02/06 – 09/07

Rowan University, *Development of Low Cost Flow Plates for Direct Methanol Fuel Cells*, K. Bhatia, 07/06 – 06/07

Inductotherm Inc., *Financial Support for 2006 Rowan Mini-Baja Team*, E. Constans and K. Bhatia, 09/05 – 05/06

Rowan University, *Enhancing Performance in a Direct Methanol Fuel Cell through Novel Metal Foam Flow Fields: Understanding Two Phase Transport in Porous Media*, K. Bhatia, 07/05 – 06/06

**Publications:**

“Carbon Dioxide Emissions and Energy Use at a University”, *Journal of Sustainability in Higher Education*, W. Riddell, K. Bhatia, M. Parisi, J. Foote, and J. Imperatore, Vol 10, No. 4, 2009.

“Energy Audits and Sustainable Engineering”, *2009 American Society of Engineering Education Conference - Austin*, J. Everett, P. Jansson, K. Bhatia, W. Riddell, C. Moore, and C. Baralus, AC 2009-1436.

- “Wind Turbines to Teach Parametric Design”, *2009 American Society of Engineering Education Conference - Austin*, S. Bakrania, K. Bhatia, W. Riddell, L. Weiss, and K. Dahm, AC 2009-1292.
- “Putting the horse before the cart – Fitting a new project into established design and writing pedagogy,” W. Riddell, S. Bakrania, K. Bhatia, J. Courtney, K. Dahm, L. Weiss, *Proceedings of the ASEE Middle Atlantic Section Spring Conference 2009*, Baltimore MD, April, 2009
- “Evaluation of Emissions and Performance of Diesel Locomotives with B20 Biodiesel Blends: Static Test Results”, *Proceedings of the 2008 ASME Rail Transportation Division Fall Technical Conference, Chicago*, D. McKenna, K. Bhatia, R. Hesketh, C. Rowen, T. Vaughn, A. Marchese, G. Chipko, and S. Guran, 2008.
- “Application of Finite Element Software to Bridge the Gap between Hand Calculations and Experimental Results in Undergraduate Heat Transfer Education”, *International Journal of Engineering Education*, K. Bhatia, Accepted for Publication, 2008.
- “Rowan University’s Clean Energy Program”, *2008 American Society of Engineering Education Conference - Pittsburgh*, J. Gillespie, K. Bhatia, P. Jansson, and W. Riddell, AC 2008-1329.
- “Use of COMSOL Multiphysics Software to Bridge the Gap between Hand Calculations and Experimental Results in Undergraduate Heat Transfer Education”, *Proceedings of the COMSOL User Conference 2007 Boston*, K. Bhatia, 2007.
- “Measurement of Particulate Matter within School Bus Passenger Compartments Under Realistic Operating Conditions”, *5<sup>th</sup> National Meeting of the U.S. Combustion Institute - San Diego 2007*, D. Martinez, R. Hesketh, A. Marchese, and K. Bhatia.
- “Design Integrated in the Mechanical Engineering Curriculum: Assessment of the Engineering Clinics”, *ASME Journal of Mechanical Design*, J. Kadlowec, K. Bhatia, T.R. Chandrupatla, J. Chen, E. Constans, H. Hartman, P. von Lockette, A. Marchese, and H. Zhang, vol. 129, p. 682-691, July 2007.
- “Use of COMSOL Multiphysics Software in Undergraduate Heat Transfer Education”, *Proceedings of the COMSOL User Conference 2006 Boston*, K. Bhatia, p. 283-286, 2006.
- “Steam Power: Novel Use of an Engine Design Project to Cross-Link Knowledge from Courses in both Mechanical Design and Thermodynamics”, *Proceedings of the 2006 Frontiers in Education Conference – San Diego*, K. Bhatia and E. Constans, Session T2E, 2006.
- “Integrating Design throughout the ME Curriculum: The Engineering Clinics”, *American Society of Mechanical Engineers IDT Conference*, J. Kadlowec, K. Bhatia, T.R. Chandrupatla, J. Chen, E. Constans, P. von Lockette, A. Marchese, and H. Zhang, September 2006.
- “Transient Carbon Monoxide Poisoning of a Polymer Electrolyte Fuel Cell Operating on Diluted Hydrogen Feed”, *Electrochimica Acta*, K. Bhatia and C.Y. Wang, vol. 49, p. 2333-2341, 2004.
- “Design and Development of Penn State University’s 2002 Hybrid Electric Ford Explorer”, *Society of Automotive Engineers*, H.M. Chance, G.L. Neal, K.A. Smith, and K.K. Bhatia, 2004 World Congress.
- “Design of the 2001 Penn State University Series Hybrid Electric Sport Utility Vehicle”, *Society of Automotive Engineers, Special Publication SP-1701*, J. Musser, R. Noss, J. Anstrom, K. Bhatia, S. Inman, B. Kleback, R. Owens, R. Stroman, March 2002.
- “Design of a Micro Direct Methanol Fuel Cell”, *Proceedings of the IMECE '01*, M. M. Mench, Z. H. Wang, K. Bhatia, and C. Y. Wang, November 2001.

**Reports to Governmental Agencies (Federal, State, and Municipal):**

“Biodiesel Home Heating Oil Blends Emissions Characterization”, a final report submitted to the New Jersey Department of Environmental Protection, K. Fitzpatrick, K. Bhatia, R. Hesketh, 2008.

“Demonstration of Emissions Reduction Using Biodiesel/ULSD Blends in Airport Ground Support Equipment”, a final report submitted to the New Jersey Department of Environmental Protection, C. Rowen, K. Bhatia, R. Hesketh, 2008.

“Evaluation of Emissions and Performance of NJ TRANSIT Diesel Locomotives with B20 Biodiesel Blends: Static and Mobile Testing”, a final report submitted to the New Jersey Department of Environmental Protection, D. McKenna, K. Bhatia, R. Hesketh, and A. Marchese, 2008.

“ACUA Operations Building Energy Audit”, a final report submitted to the Atlantic County Utility Authority, K. Foote, B. L’Esperance, C. Moore, J. Shelton, Z. Januik, K. Bhatia, J. Everet, and W. Riddell, 2008.

“ACUA Geo Building Energy Audit”, a final report submitted to the Atlantic County Utility Authority, K. Foote, B. L’Esperance, C. Moore, J. Shelton, Z. Januik, K. Bhatia, J. Everet, and W. Riddell, 2008.

“Wind Powering America – Rowan University Final Report”, a final report submitted to the New Jersey Board of Public Utilities, K. Bhatia, P. Jansson, and W. Riddell, 2008.

“Fort Dix National Guard Headquarters Building Energy Audit”, a final report submitted to the New Jersey Department of Military and Veteran’s Affairs, C. Baralus, C. Moore, K. Bhatia, J. Everet, and W. Riddell, 2008.

“In Cabin Particulate Matter Quantification and Reduction Strategies”, a final report submitted to the New Jersey Department of Environmental Protection, D. Martinez-Morett, R. Hesketh, A. Marchese, and K. Bhatia, 2008.

“Measurement and Reduction of On-Campus Student Greenhouse Gas Footprint”, a final report submitted to the New Jersey Higher Education Partnership for Sustainability, T. Hopely, J. Imperatore, K. Bhatia, and W. Riddell, July 2007.

“Removing Barriers to Entry: Wind & Energy Efficiency Outreach & Education”, a final report submitted to the New Jersey Board of Public Utilities and the New Jersey Clean Energy Program, P. Jansson, W. Riddell, and K. Bhatia, May 15, 2007.

#### **Magazine Articles:**

“Finite Element software targets complex multiphysics”, *Machine Design*, K. Bhatia, vol. 79, issue 6, p. 85-87, March 22, 2007.

“Challenges for On-board Methanol and Petroleum Fuel Processing in Hydrogen Fuel-cell Vehicles”, *Business Briefing: Global Automotive Manufacturing & Technology*, K. Bhatia and C.Y. Wang, May 2002.

#### **Graduate Students Advised:**

Dan Miller, “Sputter Coating of Plastic Flow Plates for Low Cost and Weight Direct Methanol Fuel Cells”, M.S., May 2008.

Christopher Rowen, “Demonstration of Emissions Reduction Using Biodiesel/ULSD Blends in Airport Ground Support Equipment”, M.S., August 2008.

David McKenna, “Evaluation of Emissions and Performance of NJ TRANSIT Diesel Locomotives with B20 Biodiesel Blends”, M.S., August 2008.

Kyle Fitzpatrick, “Biodiesel Home Heating Oil Blends Emissions Characterization”, M.S., August 2008.

Jamie Kostic, “Development of a Desalination Apparatus for Comparative Assessment of Membrane Distillation Performance”, M.S., In-progress, expected December 2009.

**Thesis Committees:**

Andrew Toback, "Diesel Emission Reduction Strategies for School Buses and Heavy Duty Diesel Vehicles: Exhaust After Treatment", M.S., 2005.

Marcos Villa-Gonzalez, "Two-dimensional Propagating Edge Flames", M.S., 2005.

Matthew Hammill, "Ignition Delay of Oxygenated Fuel Droplets: Development of a 1 Second Drop Tower and 1-g Results", M.S., 2005.

William Weisnet, "Development of a Robotic System for Autonomous Three-Dimensional Biological Surveying", M.S., 2007.

**Professional Societies and University Service:**

Technical publication reviewer for:

*ASME Journal of Fuel Cell Science and Technology*

*International Journal of Energy Research*

*Advances in Engineering Education*

*COMSOL Users Conference.*

American Society of Engineering Education

American Society of Mechanical Engineers, Rowan University Section Faculty Advisor

Society of Automotive Engineers

Tau Beta Pi Engineering Society, DE Alpha Chapter

Rowan University Senate, AY 2007-2009

Rowan University Sabbatical Leave Committee, AY 2007-2009

Rowan University Non-Salary Financial Support Committee, AY 2007-2008

Rowan University SAIL Scholarship Committee, AY 2007-2009

Rowan University Graduate Programs Committee, AY 2006-2007

Rowan University Technological Resources Committee, AY 2005-2006

Rowan University, Mechanical Engineering Graduate Program Advisor, AY 2006-2009

**Newspaper, Television, and Online Press Coverage of Work:**Teaching Related

Rowan University, News & Happenings – Online, "Taking a Hit: Soccer Helmets Undergo Safety Test at Rowan University", Freshmen Clinic II, 4/22/05

The Philadelphia Inquirer – Newspaper, "An engineered effect", Freshmen Clinic II, 5/5/05

Action News, ABC WPVI Philadelphia – Television, "Soccer Injuries on the Rise", Freshmen Clinic II, 7/25/05

Gloucester County Times – Newspaper, "Professor examines hard hits of sports", Freshmen Clinic II, 9/30/05

2004 – 2005 Rowan University College of Engineering Annual Report, Cover Picture of Soccer Helmet Testing

University, News & Happenings – Online, "Inductotherm Donates to Rowan Engineering Project", Jr/Sr Clinic, 11/18/05

Plain Dealer – Newspaper, "Inductotherm Donates to Rowan Engineering Project", Jr/Sr Clinic, 11/24/05

Gloucester County Times – Newspaper, "Benefactor to aid Rowan racing effort, Jr/Sr Clinic, 11/26/05

Rowan University Engineering News, Photo of Inductotherm Gift to Rowan Mini-Baja Project, Spring 06

Rowan University College of Engineering News Fall 2006, Photo Discussing Student Projects with Parents, 9/1/06

Rowan University 2007 Calendar, Photo of Soccer Helmet Testing, 1/1/2007

Rowan Magazine, Soccer Helmet Testing Photo Shoot, p.21, Spring 2007

COMSOL News, "University brings PDEs to life in undergraduate education", p. 12, Spring 2007

Atlantic City Press – Newspaper, "Students, start your turbines!", 12/9/2008

#### Research Related

Southwest Senior – Newspaper, "U.S. late in addressing fuel problems", June 2006

Rowan University, News & Happenings – Online, "High gas prices here to stay, says engineering professor", 8/17/06

Courier Post – Newspaper, "Tip Du jour: Reduce fuel costs", 8/24/06

Bestsydication.com – Online, "High Gas Prices – Fuel Economy and Conservation Tips to Save Money", 8/31/06

Reliableplanet.com – Online, "Engineering prof says U.S. has a lot of catching up to do", 5/30/06

Rowan University College of Engineering News Spring 2007, Photo of School Buss Emissions Testing, 1/1/07

Rowan University, News & Happenings – Online, "Engineering profs, students working to make school buses safer", 1/4/07

Rowan University, News & Happenings – Online, "Hesketh to discuss school bus pollution study on WGLS", 1/12/07

KYW News Radio 1060 – Radio, Interview with Anthony Marchese on School Bus In-Cabin Particulate Study, 1/12/07

Rowan Magazine, "Safer inside and out", p. 6, Spring 2007

Rowan University College of Engineering News Fall 2007, "Rowan Engineers on Board with New State Biodiesel Project", 9/1/07

Ashbury Park Press – Newspaper, "Ocean Gate council to hear about benefits of wind power", 9/25/07

Ocean County Observer – Newspaper, "Blowin' in the wind", 12/21/07

The Philadelphia Inquirer – Newspaper, "A gust of innovation will energize a town on the Jersey Shore", 12/28/07

Asbury Park Press – Newspaper, "Testing complete, wind gauge goes", 6/6/2008

Gloucester County Times – Newspaper, "First building opens at Rowan's Tech Park", 10/28/2008

#### Service/Outreach Related

Rowan University, News & Happenings – Online, "Rowan Engineers Pumpkin Chuck", 10/13/05

Gloucester County Times – Newspaper, "On a fling and a prayer", 10/29/05

Philadelphia Inquirer – Newspaper, Photo Brief – Catapult, 10/29/05

The Press of Atlantic City – Newspaper, "Ready, aim...squash!", 10/29/05

Good Morning Arizona, KTVK Phoenix – Television, “Rowan Engineers Hold 3<sup>rd</sup> Annual Pumpkin Launching Competition”, 10/30/05

UPN News 13, KCOP Los Angeles – Television, “Rowan Engineers Hold 3<sup>rd</sup> Annual Pumpkin Launching Competition”, 10/29/05

10 O’Clock News Hour, KMPH Fresno – Television, “Rowan Engineers Hold 3<sup>rd</sup> Annual Pumpkin Launching Competition”, 10/29/05

The News Show, KTVK Phoenix – Television, “Rowan Engineers Hold 3<sup>rd</sup> Annual Pumpkin Launching Competition”, 10/29/05

Fox 26 News at Nine, KRIV Houston – Television, “Rowan Engineers Hold 3<sup>rd</sup> Annual Pumpkin Launching Competition”, 10/29/05

Fox 16 News, KLRT Little Rock – Television, “Rowan Engineers Hold 3<sup>rd</sup> Annual Pumpkin Launching Competition”, 10/29/05

Fox 6 News At 9:00, WITI Milwaukee – Television, “Rowan Engineers Hold 3<sup>rd</sup> Annual Pumpkin Launching Competition”, 10/29/05

Fox 29 Ten O’Clock News, WTXF Philadelphia – Television, “Rowan Engineers Hold 3<sup>rd</sup> Annual Pumpkin Launching Competition”, 10/28/05

Action News, WPVI Philadelphia – Television, “Rowan Engineers Hold 3<sup>rd</sup> Annual Pumpkin Launching Competition”, 10/28/05

Rowan University, News & Happenings – Online, “Engineering Students Reel in Awards at Regional Robotics Competition”, 4/8/06

Atlantic City Press – Newspaper, “Rowan engineering students help handicapped go fishing”, 6/12/06

Philadelphia Inquirer – Newspaper, “Rod allows the disabled to fish”, 6/25/06

Rowan University, News & Happenings – Online, “Rowan engineers, Mt. Laurel middle schoolers plan for a whale of a good time”, 5/11/06

Burlington County Times – Newspaper, “Mt. Laurel kids have a whale of a tale”, 5/16/06

Phillyburbs.com – Online, “Mt. Laurel kids have a whale of a tale”, 5/16/06

Courier Post – Newspaper, “Beware flying pumpkins”, 10/27/07

Gloucester County Times – Newspaper, “Rainy day punkin’ chunkin’”, 10/27/07

Press of Atlantic City – Newspaper, “Watch out for flying pumpkins”, 10/27/07

ESPN Sportcenter – Television, “Top Plays #9: New Jersey 4<sup>th</sup> Annual Mini-Pumpkin Chunking Competition”, 10/27/07

Rowan University College of Engineering News Fall 2007, “4<sup>th</sup> Annual Mini Pumpkin Chunkin’ Competition”, 9/1/07