

# Chad A. Baker

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Resume  
calbaker@utexas.edu  
214-695-4636

## Objective

Full-time position utilizing skills in modeling and experimentation to solve challenging technical problems that address energy or environmental problems facing humanity.

## Research Interests

Modeling mass, heat, and energy transport processes; combustion modeling; biofuel combustion; automotive powertrain optimization; heat exchanger optimization; modeling and optimizing thermoelectric devices; validating models through experimentation

## Important Coursework

Combustion Theory, Convection Heat Transfer, Multi-scale Flow and Transport Phenomena, Reacting Flows and Plasmas, Micro-scale Thermal Fluids Sciences, Molecular Gas Dynamics, Fundamentals of Heat and Mass Transfer, Fundamentals of Combustion, Fundamentals of Incompressible Flow, Internal Combustion Engines

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## Education

**The University of Texas at Austin**, Austin, TX USA

Ph.D., **Mechanical Engineering**, December 2012

Advisers: **Professor Matthew J. Hall** and **Professor Li Shi**

Area of Study: Thermal/Fluids Systems

GPA: 3.67/4.00

**The University of Texas at Austin**, Austin, TX USA

Master of Science, **Mechanical Engineering**, August 2009

Thesis Topic: *Vapor Transport Techniques for Growing Macroscopically Uniform Zinc Oxide Nanowires*

Advisers: **Professor Matthew J. Hall** and **Professor Li Shi**

Area of Study: Thermal/Fluids Systems

GPA: 3.46/4.00

**Texas A&M University**, College Station, TX USA

Bachelor of Science, **Mechanical Engineering**, May 2007

GPA: 3.23/4.00

## Professional Experience

*Graduate Research Assistant*

**The University of Texas at Austin**, Austin, TX USA

**October 2010 to Present**

Thermoelectric diesel exhaust waste heat recovery to improve fuel efficiency

- Developed two dimensional thermoelectric device model with iterative coupling to heat exchanger model
- Designed heat exchanger experiment to test thermoelectric devices in Cummins engine exhaust

*Graduate Research Assistant*

**The University of Texas at Austin**, Austin, TX USA

**January 2008 to Present**

ZnO nanowires as novel catalyst substrate with analytical species transport model

- Developed two dimensional analytical model for catalyst species concentration
- Developed scalable method for chemical vapor transport ZnO nanowire growth
- Designed heterogeneous combustion reactor for testing species transport enhancement caused by ZnO nanowires

*Graduate Technical Intern*

**Solvay Engineered Polymers**, Mansfield, TX USA

**May 2007 to August 2007**

Polymer additives to increase durability of raw material for Ford King Ranch F-150 wheel flare

- Designed experiments to test additive migration and degradation in thermoplastics.
- Trained researchers to use lab equipment such as tensile testers and injection molders.
- Assisted other interns in Project Engineering with reducing production down time.

*Project Engineering Intern*

**Solvay Engineered Polymers**, Mansfield, TX USA

**May 2006 to August 2006**

Polymer manufacturing plant improvements

- Successfully designed improved cooling system for 3000 horsepower motors to prevent motor failures.
- Managed contractors for installation of improved lighting, safety equipment, and various structures to improve serviceability of polymer production lines.

**Publications**

C. Baker, A. O. Emiroglu, R. Mallick, O. Ezekoye, M. Hall, L. Shi., *Experimental and Modeling Study of Hydrocarbon Oxidation over Catalytic Surfaces of ZnO Nanowires and  $\gamma$ -Alumina*, in preparation.

C. Baker, L. Shi, M. Hall, *Simulation of Thermoelectric Module Heat Exchanger Performance in the Exhaust of a Medium-Duty Diesel Engine*, in review.

C. Baker, P. Vuppuluri, M. Hall, L. Shi., *Model of Heat Exchanger for Waste Heat Recovery from Diesel Engine Exhaust for Thermoelectric Power Generation*, accepted.

**Presentations**

C. Baker, P. Vuppuluri, L. Shi, M. Hall, *Model of Heat Exchanger for Recovering Waste Heat from Diesel Engine Exhaust for Thermoelectric Power Generation*, ICT 2011, July 2011.

C. Baker, A. Osman Emiroglu, M. Hall, L. Shi, *ZnO Nanowires as a Novel Catalyst Substrate*, 22nd North American Catalysis Society Meeting, June 2011.

C. Baker, invited presentation: *ZnO Nanowires as a Novel Catalyst Substrate*, Southwest Research Institute, November 2010.

**Technical Skills**

Instrumentation and Control: Simulink, LabVIEW, Omega temperature controllers, and National Instruments control and data acquisition hardware and software

Computer Skills: Microsoft Office, Python, SciPy, NumPy, MATLAB, L<sup>A</sup>T<sub>E</sub>X, LyX, Emacs, various programming environments, object oriented programming, Linux, SolidWorks, Autodesk Inventor

**Awards**

**The University of Texas at Austin**, Austin, TX USA

Richard J. Kokes Travel Award for 22nd North American Catalysis Society Meeting

Association of Energy Engineers Foundation Scholarship Award

N.K. Wright Centennial Memorial Endowed Presidential Scholarship

Nano Night '08 Best Poster

**Prior to University Education**

Eagle Scout