Craig Bowman
Professor of Mechanical Engineering

CONTACT INFORMATION
- Administrative Contact
  Mary Hanrahan - Thermosciences Group Administrator
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Bio
BIO
Professor Bowman studies reacting flows, primarily through experimental means, and the processes by which pollutants are formed and destroyed in flames. In addition, he is interested in the environmental impact of energy use, specifically greenhouse gas emissions from use of fossil fuels.

ACADEMIC APPOINTMENTS
- Professor, Mechanical Engineering

HONORS AND AWARDS
- Research Prize, Humboldt (1997)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS
- Member, National Academy of Engineering (2013 - present)

PROFESSIONAL EDUCATION
- PhD, Princeton, Aerospace and Mechanical Sciences (1966)

Teaching
COURSES
2018-19
- Combustion Applications: ME 372 (Spr)
- Energy Systems I: Thermodynamics: ME 370A (Aut)
- High Temperature Gasdynamics Laboratory Research Project Seminar: ME 390A (Spr)

2017-18
- Combustion Applications: ME 372 (Spr)
- Combustion Fundamentals: ME 371 (Win)
- Compressible Flow: ME 355 (Win)

2016-17

- Combustion Applications: ME 372 (Spr)
- Combustion Fundamentals: ME 371 (Win)
- Energy Systems I: Thermodynamics: ME 370A (Aut)

2015-16

- Combustion Fundamentals: ME 371 (Win)
- Fluid Mechanics: Compressible Flow and Turbomachinery: ME 131B (Spr)
- High Temperature Gasdynamics Laboratory Research Project Seminar: ME 390A (Aut)
- Physical Gas Dynamics: ME 362A (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)
Terry Peng, Yu Wang, Rui Xu

Postdoctoral Faculty Sponsor
Kun Wang

Publications

PUBLICATIONS

- A Physics-based approach to modeling real-fuel combustion chemistry - III. Reaction kinetic model of JP10 COMBUSTION AND FLAME
  Tao, Y., Xu, R., Wang, K., Shao, J., Johnson, S. E., Movaghar, A., Han, X., Park, J., Lu, T., Brezinsky, K., Egolfopoulos, F. N., Davidson, D. F., Hanson, et al
  2018; 198: 466–76

- A physics based approach to modeling real-fuel combustion chemistry - IV. HyChem modeling of combustion kinetics of a bio-derived jet fuel and its blends with a conventional Jet A COMBUSTION AND FLAME
  2018; 198: 477–89

- A physics-based approach to modeling real-fuel combustion chemistry - II. Reaction kinetic models of jet and rocket fuels COMBUSTION AND FLAME
  2018; 193: 520–37

- A physics-based approach to modeling real-fuel combustion chemistry - I. Evidence from experiments, and thermodynamic, chemical kinetic and statistical considerations COMBUSTION AND FLAME
  Wang, H., Xu, R., Wang, K., Bowman, C. T., Hanson, R. K., Davidson, D. F., Brezinsky, K., Egolfopoulos, F. N.
  2018; 193: 502–19

- A Shock Tube Study of the Reactions of NCO with O and NO using NCO Laser Absorption Twenty-Fourth Symposium (International) on Combustion
  Mertens, J. D., Dean, A. J., Hanson, R. K., Bowman, C. T.
  : 701–710

- A Shock Tube Study of the CO+OH # CO2+H Reaction Twenty-Fifth Symposium (International) on Combustion
  Wooldridge, M. S., Hanson, R. K., Bowman, C. T.
  : 741–748

- High Temperature Shock Tube Study of Reactions of CH and C-Atoms with N2 Twenty-Third Symposium (International) on Combustion
  Dean, A. J., Hanson, R. K., Bowman, C. T.
  : 259–265

- A Shock Tube Study of Methane Decomposition Using Laser Absorption by CH3 Twenty-Fourth Symposium (International) on Combustion
Davidson, D. F., DiRosa, M. D., Chang, A. Y., Hanson, R. K., Bowman, C. T.

: 589–596

* A Shock Tube Study of the Reaction of CN and NCO with NO2 *Twenty-Fifth Symposium (International) on Combustion*  
Wooldridge, S. T., Mertens, J. D., Hanson, R. K., Bowman, C. T.

: 983–991

* An experimental and kinetic modeling study of n-dodecane pyrolysis and oxidation *COMBUSTION AND FLAME*  
2016; 163: 12-30

* Shock Tube Measurements of the Rate Constant for the Reaction Ethanol + OH. *journal of physical chemistry. A*  
Stranic, I., Pang, G. A., Hanson, R. K., Golden, D. M., Bowman, C. T.  
2014; 118 (5): 822-828

* Shock Tube Measurements of the tert-Butanol + OH Reaction Rate and the tert-C4H8OH Radical β-Scission Branching Ratio Using Isotopic Labeling. *journal of physical chemistry. A*  
Stranic, I., Pang, G. A., Hanson, R. K., Golden, D. M., Bowman, C. T.  
2013; 117 (23): 4777–4784

* CFD simulation of a confined axisymmetric laminar methane-air diffusion flame *8th Mediterranean Combustion Symposium*  
Fletcher, D. F., Bowman, C. T., Haynes, B. S.  
2013

* Experimental Determination of the High-Temperature Rate Constant for the Reaction of OH with sec-Butanol JOURNAL OF PHYSICAL CHEMISTRY A*  
Pang, G. A., Hanson, R. K., Golden, D. M., Bowman, C. T.  
2012; 116 (39): 9607-9613

* High-Temperature Rate Constant Determination for the Reaction of OH with iso-Butanol JOURNAL OF PHYSICAL CHEMISTRY A*  
Pang, G. A., Hanson, R. K., Golden, D. M., Bowman, C. T.  
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* Rate Constant Measurements for the Overall Reaction of OH+1-Butanol -> Products from 900 to 1200 K JOURNAL OF PHYSICAL CHEMISTRY A*  
Pang, G. A., Hanson, R. K., Golden, D. M., Bowman, C. T.  
2012; 116 (10): 2475-2483

* High-Temperature Measurements of the Rate Constants for Reactions of OH with a Series of Large Normal Alkanes: n-Pentane, n-Heptane, and n-Nonane ZEITSCHRIFT FUR PHYSIKALISCHE CHEMIE-INTERNATIONAL JOURNAL OF RESEARCH IN PHYSICAL CHEMISTRY & CHEMICAL PHYSICS*  
Pang, G. A., Hanson, R. K., Golden, D. M., Bowman, C. T.  
2011; 225 (11-12): 1157-1178

* Vitiated ethane oxidation in a high-pressure flow reactor *COMBUSTION AND FLAME*  
Walters, K. M., Bowman, C. T.  
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* High-temperature shock tube study of the reactions CH3+OH -> products and CH3OH+Ar -> products INTERNATIONAL JOURNAL OF CHEMICAL KINETICS*  
Vasudevan, V., Cook, R. D., Hanson, R. K., Bowman, C. T., Golden, D. M.  
2008; 40 (8): 488-495

* Shock tube study of the reaction of CH with N2: Overall rate and branching ratio JOURNAL OF PHYSICAL CHEMISTRY A*  
Vasudevan, V., Hanson, R. K., Bowman, C. T., Golden, D. M., Davidson, D. F.  
2007; 111 (46): 11818-11830

* Effects of pressure on performance of mesoscale burner arrays for gas-turbine applications JOURNAL OF PROPULSION AND POWER*  
2007; 23 (4): 884-886

* High-temperature shock tube measurements of methyl radical decomposition JOURNAL OF PHYSICAL CHEMISTRY A*  
Vasudevan, V., Hanson, R. K., Golden, D. M., Bowman, C. T., Davidson, D. F.  
2007; 111 (19): 4062-4072
- High-temperature measurements of the rates of the reactions CH₂O+Ar -> Products and CH₂O+O₂ -> Products. *Proceedings of the Combustion Institute*  
  Vasudevan, V., Davidson, D. F., Hanson, R. K., Bowman, C. T., Golden, D. M.  
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- Mesoscale burner Arrays for gas-turbine reheat applications. *Journal of Propulsion and Power*  
  Lee, S., Svrcek, M., Edwards, C. F., Bowman, C. T.  
  2006; 22 (2): 417-424

- Experimental study of confined, swirling, nonpremixed gas flame for validation of simulations. *Journal of Propulsion and Power*  
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- A shock tube study of the product branching ratio of the NH₂+NO reaction at high temperatures. *Journal of Physical Chemistry A*  
  Song, S. H., Hanson, R. K., Bowman, C. T., Golden, D. M.  
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  Herbon, J. T., Hanson, R. K., Golden, D. M., Bowman, C. T.  
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- A shock tube study of the NH₂+NO₂ reaction. 29th International Combustion Symposium  
  Song, S., Golden, D. M., Hanson, R. K., Bowman, C. T.  
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  Schmidt, C. C., Bowman, C. T.  

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  Bates, R. W., Golden, D. M., Hanson, R. K., Bowman, C. T.  
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  Bowman, C. T.
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• An experimental investigation of the effects of compressibility on a turbulent reacting mixing layer JOURNAL OF FLUID MECHANICS
Miller, M. F., Bowman, C. T., Mungal, M. G.
1998; 356: 25-64

• Measurement of the rate coefficient of the reaction CH+O-2->products in the temperature range 2200 to 2600 K INTERNATIONAL JOURNAL OF CHEMICAL KINETICS
Rohrig, M., Petersen, E. L., Davidson, D. F., Hanson, R. K., Bowman, C. T.
1997; 29 (10): 781-789

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Wooldridge, M. S., Hanson, R. K., Bowman, C. T.
1997; 57 (3): 425-434

• Mechanisms and Modeling of Gas-Phase Aftertreatment Methods for NO Removal from Combustion Products Physical and Chemical Aspects of Combustion
Bowman, C. T.
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Wooldridge, M. S., Hanson, R. K., Bowman, C. T.
1997; 57 (3): 425-434

• A shock tube study of reactions of CN with HCN, OH, and H-2 using CN and OH laser absorption INTERNATIONAL JOURNAL OF CHEMICAL KINETICS
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PADMANABHAN, K. T., Bowman, C. T., Powell, J. D.
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• A shock tube study of reactions of CN with HCN, OH, and H-2 using CN and OH laser absorption INTERNATIONAL JOURNAL OF CHEMICAL KINETICS
WOOLDRIDGE, S. T., Hanson, R. K., Bowman, C. T.
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Davidson, D. F., Petersen, E. L., Rohrig, M., Hanson, R. K., Bowman, C. T.
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• High-pressure methane oxidation behind reflected shock waves 26th International Symposium on Combustion
Petersen, E. L., Rohrig, M., Davidson, D. F., Hanson, R. K., Bowman, C. T.  
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- **A SHOCK-TUBE STUDY OF METHYL-METHYL REACTIONS BETWEEN 1200 AND 2400 K**  
  *INTERNATIONAL JOURNAL OF CHEMICAL KINETICS*  
  Davidson, D. F., DIROSA, M. D., Chang, E. J., Hanson, R. K., Bowman, C. T.  
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- **SIMULTANEOUS LASER-ABSORPTION MEASUREMENTS OF CN AND OH IN A SHOCK-TUBE STUDY OF HCN +OH-**  
  *INTERNATIONAL JOURNAL OF CHEMICAL KINETICS*  
  WOOLDRIDGE, S. T., Hanson, R. K., Bowman, C. T.  
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- **MEASUREMENTS OF ARGON COLLISION BROADENING IN THE CN B-2-SIGMA(+)-X(2)SIGMA(+)(0,0) SPECTRUM**  
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  WOOLDRIDGE, S. T., Hanson, R. K., Bowman, C. T.  
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- **On-line combustor performance optimization**  
  *Conference on Sensing, Actuation, and Control in Aeropropulsion*  
  PADMANABHAN, K. T., Bowman, C. T., Powell, J. D.  
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- **Revised Values for the Rate Coefficients of Ethane and Methane Decomposition**  
  *International Journal of Chemical Kinetics*  
  Davidson, D. F., Hanson, R. K., Bowman, C. T.  
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  Padmanabhan, K. T., Bowman, C. T., Powell, J. D.  
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- **Active adaptive control of combustion**  
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- **Reexamination of Shock-Tube Measurements of the Rate Coefficient of H + O2 -> OH + O**  
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- **An Experimental Investigation of Supersonic Reacting Mixing Layers**  
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• A SHOCK-TUBE STUDY OF H + HNCO -] NH2 + CO INTERNATIONAL JOURNAL OF CHEMICAL KINETICS
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