Stanford



Brian Cantwell

Edward C. Wells Professor in the School of Engineering and Professor of Mechanical Engineering, Emeritus

Aeronautics and Astronautics

CONTACT INFORMATION

- **Administrator**

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Bio

BIO

Professor Cantwell's research interests are in the area of turbulent flow. Recent work has centered in three areas: the direct numerical simulation of turbulent shear flows, theoretical studies of the fine-scale structure of turbulence, and experimental measurements of turbulent structure in flames. Experimental studies include the development of particle-tracking methods for measuring velocity fields in unsteady flames and variable density jets. Research in turbulence simulation includes the development of spectral methods for simulating vortex rings, the development of topological methods for interpreting complex fields of data, and simulations of high Reynolds number compressible and incompressible wakes. Theoretical studies include predictions of the asymptotic behavior of drifting vortex pairs and vortex rings and use of group theoretical methods to study the nonlinear dynamics of turbulent fine-scale motions. Current projects include studies of fast-burning fuels for hybrid propulsion and decomposition of nitrous oxide for space propulsion.

ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, Aeronautics and Astronautics
- Affiliate, Precourt Institute for Energy
- Affiliate, Stanford Woods Institute for the Environment

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Elected Member, National Academy of Engineering (2013 - present)

PROFESSIONAL EDUCATION

- PhD, Caltech (1976)

LINKS

- https://web.stanford.edu/~cantwell/: https://web.stanford.edu/~cantwell/

Teaching

COURSES

2023-24

- Aircraft and Rocket Propulsion: AA 283 (Spr)

Publications

PUBLICATIONS

- **Integral measures of the zero pressure gradient boundary layer over the Reynolds number range 0 <= R-tau < infinity** *PHYSICS OF FLUIDS*
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- **Diode Laser Ignition Mechanism for Hybrid Propulsion Systems**
  Dyrda, D. M., Korneyeva, V., Cantwell, B. J.
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- **Diode Laser Ignition of a Poly(Methyl Methacrylate) and Gaseous Oxygen Hybrid Motor** *JOURNAL OF PROPULSION AND POWER*
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- **Symmetries and analytical solutions of the Hamilton-Jacobi-Bellman equation for a class of optimal controlproblems** *OPTIMAL CONTROL APPLICATIONS & METHODS*
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- **Schlieren and OH* chemiluminescence imaging of combustion in a turbulent boundary layer over a solid fuel** *EXPERIMENTS IN FLUIDS*
  Jens, E. T., Miller, V. A., Cantwell, B. J.

2016; 57 (3)

- **A new boundary layer integral method based on the Universal Velocity Profile** *Physics of Fluids*
  Cantwell, B. J., Bilgin, E., Needels, J. T.
  2022
- **Similarity solution of fuel mass transfer, port mass flux coupling in hybrid propulsion** *JOURNAL OF ENGINEERING MATHEMATICS*
  Cantwell, B. J.
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- **Nitrogen removal with energy recovery through N2O decomposition** *ENERGY & ENVIRONMENTAL SCIENCE*
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  CHANDLER, A., CANTWELL, B., J., HUBBARD, G., S.
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