

## Charles David (Dave) Pruett

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### PERSONAL INFORMATION

Married, one daughter    Citizenship: USA    Military Service: Veteran

### EDUCATION

Ph.D. in Applied Mathematics, Aug. 1986, University of Arizona, Tucson, AZ. Dissertation: *Numerical Simulation of Nonlinear Waves in Free Shear Layers*. Dissertation advisor: Dr. H.F. Fasel.

M.S. in Applied Mathematics, Aug. 1980, University of Virginia, Charlottesville, VA. Thesis: *Determination of Angle of Attack by the Shuttle Entry Air Data System in Supersonic Flow*.

M.Ed., Aug. 1974, University of Richmond, Richmond, VA.

B.S. in Mechanical Engineering, June 1970, Virginia Polytechnic Institute and State University, Blacksburg, VA.

### ACADEMIC EXPERIENCE

Full Professor (since 2003), Associate Professor (1998-2002), Department of Mathematics and Statistics, James Madison University, Harrisonburg, VA, Jan. 1996-present. Instruct undergraduates in a broad spectrum of courses in the mathematical sciences; develop curriculum; advise students; perform research in the applications of mathematics and scientific computing; and occasionally develop and instruct courses for the Honors Program and the Office of International Programs. Specific mathematics courses taught: calculus I, II, and III; calculus for non majors; computers and numerical algorithms; numerical analysis I and II; complex variables; dynamical systems; optimization; methods of applied mathematics; computational fluid dynamics.

Research Scientist and Adjunct Instructor of Applied Science, The College of William and Mary, Williamsburg, VA, July 1994-Dec. 1995: Perform NASA-related basic research in the area of boundary-layer stability and transition; develop numerical algorithms for solving the compressible Navier-Stokes equations; perform direct numerical simulations to investigate transition physics. Instruct a graduate-level numerical methods course (*Scientific Computing: An Introduction with Parallel Computing* by Golub and Ortega, and *Numerical Recipes*). Interact with graduate students. Previously, adjunct instructor of "Harvard" calculus, Mathematics Department, The College of William and Mary, Fall semester, 1993.

Assistant Professor, Department of Mathematical Sciences, Virginia Commonwealth University, Richmond, VA, Aug. 1986-July 1989: Taught 9-10 hours/semester of graduate-level applied mathematics and standard undergraduate-level mathematics, conducted research, and performed service by participation in several university committees, among them a curriculum committee. Graduate courses taught and texts: MAT515 Numerical Analysis I (Conte and deBoor, 1980, *Elementary Numerical Analysis—An Algorithmic Approach*); MAT516 Numerical Analysis II (Ortega and Poole, 1981, *An Introduction to Numerical Methods for Differential Equations*); MAT617 Applied Mathematics I (Stakgold, 1979, *Green's Functions and Boundary Value Problems*). Undergraduate courses taught: Calculus II, Structured Programming in Fortran, College Algebra (both lecture and lab sections), and Numerical Calculus.

Adjunct mathematics instructor, Pima Community College, Tucson, AZ, Jan. 1984-Dec. 1984: Taught first and second semesters of an Engineering Calculus course.

High-school mathematics teacher, Henrico County Schools, VA, Aug. 1973-June 1976: Taught a wide spectrum of courses in mathematics and supervised extra-curricular activities, among them SODA (Student Organization for Developing Attitudes), which teamed pairs of high-school students with elementary classes.

## **OTHER SIGNIFICANT EMPLOYMENT EXPERIENCE**

Attended conference, Visions of Integration II: Perspectives on Human Distinctiveness, James Madison University, Oct. 11-14, 2007.

Senior Scientist, Analytical Services and Materials, Inc., 107 Research Drive, Hampton, VA, July 1991-July 1994: Developed, tested, and implemented high-order accurate and computationally efficient algorithms for solving the compressible Navier-Stokes equations on supercomputers. Performed numerical simulations of instability and laminar-turbulent transition in high-speed, wall-bounded flows. Analyzed data from such simulations to investigate the physics of transition. Supervised a “task unit” of five research scientists.

National Research Council Associate, Theoretical Flow Physics Branch, Fluid Mechanics Division, NASA Langley Research Center, Hampton, VA, July 1989-July 1991: Conducted direct numerical simulations of instability and transition in high-speed compressible flows, and developed algorithms for efficient and accurate solution of the compressible boundary-layer equations and the compressible Navier-Stokes equations.

Engineering analyst, Analytical Mechanics Associates, Hampton, VA, June 1979-Jan. 1982 (part-time and full-time): performed mathematical analysis and developed software for the Shuttle Entry Air Data System (SEADS), a NASA experiment on Shuttle Columbia in which air data (wind-relative attitude, freestream and dynamic pressures, and Mach number) are extracted from Orbiter surface pressure measurements during re-entry.

Engineer, Kentron International, Hampton, VA, Oct. 1976-Aug. 1978: performed conceptual design, detailed design, and mathematical analysis for several Shuttle-related NASA experiments.

Aircraft Maintenance Officer, USAF, Oct. 1970-Aug. 1971. (Voluntary early release option)

## **FIELDS OF SPECIAL INTEREST WITHIN DISCIPLINE**

Applied Mathematics. Numerical methods. Scientific Computing.

## **PROFESSIONAL MEMBERSHIPS**

Member, Society for Industrial and Applied Mathematics (“SIAM”)

Metanexus Institute (promotes science/religion dialogue)

## **SPECIAL AWARDS, FELLOWSHIPS, AND OTHER HONORS**

First recipient of the Mengebier Endowed Professorship, gift of James Madison University’s Class of 1958 to the University in its centenary year, 2008.

Recipient of James Madison University's first (2008) Provost's Award for Excellence in Honors Teaching, March 20, 2008.

2008-2009 Madison Scholar, awarded by the faculty of the College of Science & Mathematics in recognition of cumulative accomplishments of an individual, with emphasis on scholarly work done at JMU.

2004-2005 Distinguished Teacher Award, College of Science & Mathematics, James Madison University.

C.D. Pruett, Principal Investigator, "RANS, LES, and DNS: Toward Mutually Consistent Formulations," NASA Grant NAG1-02033 for \$47,000, Jan. 2002.

C.D. Pruett, 2001 Course Award recipient, Center for Theology and the Natural Sciences, for \$10,000, to continue development of Honors 200D: "From Black Elk to Black Holes: Shaping a Myth for a New Millennium."

J.S. Sochacki, C.D. Pruett, W.H. Ingham, and D.W. Peterson, "A Collaborative Computational Science Program," NSF CCLI Grant for \$163,105, 8/99-7/01.

C.D. Pruett, Principal Investigator, with J.S. Sochacki, Co-Investigator, "Large-Eddy Simulation for Aeroacoustic Applications," NASA Grant NAG1-2033 for \$26,360, Dec. 1997.

C.D. Pruett, Principal Investigator, "Computational Investigations of Noise Suppression in Subsonic Round Jets," NASA Grant NAG1-1802 for \$25,883, Oct. 1996.

Principal investigator for "Computational Investigations of Noise Suppression in Subsonic Round Jets," a National Aerodynamic Simulator (NAS) project that was allocated 150 Cray-C90 hours for 1996-1996.

Recipient of the 1996 American Society of Mechanical Engineers/Fluids Engineering Division Robert T. Knapp Award, presented at the 1996 Fluids Engineering Division Annual Summer Meeting, San Diego, July 8-11, 1996. The Knapp Award recognizes "the best paper dealing with results from analytical, numerical, or laboratory research that has been presented to the Fluids Engineering Division of the ASME with the last two years."

C.D. Pruett, Principal Investigator, "Large-Eddy Simulation of a Compressible Axisymmetric Jet," NASA Grant NAG1-1772 for \$54,137 to the College of William and Mary, Oct. 1995.

With Nicol et al., "Acquisition of a Parallel Graphics Computer for Inter-Disciplinary Computational Science Research," NSF ARI Instrumentation Grant for \$135,918 to purchase an SGI Onyx computer, College of William and Mary, 1995.

C.D. Pruett and Dennis M. Manos, Co-Investigators, "Spatial Direct Numerical Simulation of Transition in Hypersonic Flows," AFOSR Grant F49620-95-1-0146 for \$25,000 to the College of William and Mary, Feb. 1995.

Principal investigator for "Numerical Investigation of Transitioning and Turbulent Compressible Flows," a National Aerodynamic Simulator (NAS) project that was allocated 105 Cray-C90 hours for 1995-1996.

Principal investigator for "A Numerical Investigation of Transition on a Flared Cone," a National Aerodynamic Simulator (NAS) project that was allocated 400 Cray-C90 hours for 1994-1995.

Principal investigator for "Spatial Direct Numerical Simulation of High-Speed Transitional Flow," a National Aerodynamic Simulator (NAS) project that was allocated 2000 Cray-2 hours for 1993-1994.

Principal investigator for "Computational Studies in High-Speed Transition," a National Aerodynamic Simulator (NAS) project that was allocated 900 Cray-2 hours for 1992-1993.

Principal investigator, with co-investigators T.A. Zang and G. Erlebacher, for “Studies in Compressible Transition,” a National Aerodynamic Simulator (NAS) project that was allocated 1100 Cray-2 hours for 1991-1992.

Honorary Superior Accomplishment Award for “Conducting first temporal direct numerical simulations at Mach 4.5 on a cylinder and at Mach 6.8 on a cone into the nonlinear transitional regime,” awarded by the Fluid Mechanics Division of the Aeronautics Directorate, NASA Langley Research Center, Aug. 22, 1991.

National Research Council Associateship, NASA Langley Research Center, July 1989 to July 1991.

Awarded competitive research stipend for Summer 1987 by the Grants-In-Aid Program for Faculty of Virginia Commonwealth University.

Awarded NASA Traineeship in Computational Fluid Dynamics, University of Arizona, 1982-3, 1983-4 academic years.

Member of Pi Tau Sigma and treasurer of Omicron Delta Kappa as undergraduate at VPI&SU.

### **INVITED PRESENTATIONS**

“Spatial Direct Numerical Simulation of Transitioning High-Speed Flows,” presented at the Second Symposium on Transition and Turbulence in Compressible Flows, ASME Fluids Engineering Division Summer Meeting, Hilton Head, SC, Aug. 1995.

### **COLLOQUIUM PRESENTATIONS**

C.D. Pruett and W.H. Ingham, “The Ultimate N-Body Algorithm: Parameter-Free, Adaptive, and Parallel,” The University of Stuttgart, Institute for Aerodynamics and Gasdynamics, August 22, 2008.

“Simulating Laminar-Turbulent Transition of Hypersonic Flow: A Computational Grand Challenge of 1990 Vintage,” Lehrstuhl for Aerodynamik, Technical University of Munich, August 19, 2008.

“Temporal Large-Eddy Simulation: Theory and Practice,” Department of Mathematics, University of Pittsburgh, April 7, 2006.

“Direct Numerical Simulation of Laminar-Turbulent Transition in High-Speed Axisymmetric Boundary Layers,” Mechanical and Aerospace Engineering Colloquium, University of Virginia, March 30, 2006.

“At the Dawn of the Third Copernican Revolution,” presented for the Shenandoah Anabaptist Society meeting of February 23, 2006, Eastern Mennonite University.

“Temporal Large-Eddy Simulation: Theory and Practice,” presented in the morning and afternoon, respectively, of the Institute for Aerodynamics and Gasdynamics, University of Stuttgart, and the Department of Aerospace Engineering, Technical University of Munich, October 4, 2005.

“Temporal Large-Eddy Simulation—Part I: Burger’s Flow,” and “Temporal Large-Eddy Simulation—Part II: Channel Flow,” Sandia Laboratories, December 18-19, 2003.

“A Temporal Approximate Deconvolution Model for Large-Eddy Simulation,” Institute for Fluid Mechanics, Technical University of Dresden, June 30, 2003, and Institute of Aerodynamics and Gasdynamics, University of Stuttgart, June 23, 2003.

“Direct Numerical Simulation of Transition in High-Speed Axisymmetric Boundary Layers: Part I–Setup and Algorithmic Considerations,” Institute of Aerodynamics and Gasdynamics, University of Stuttgart, June 17, 2003.

“Direct Numerical Simulation of Transition in High-Speed Axisymmetric Boundary Layers: Part II–Results and Conclusions,” Institute of Aerodynamics and Gasdynamics, University of Stuttgart, June 18, 2003.

“DNS of Transitional Hypersonic Boundary-Layer Flows on Straight and Flared Cones,” Institute for Fluid Dynamics, ETH (Swiss Federal Institute of Technology), Zurich, Switzerland, August 4, 1998.

“On the Direct Approximation of Subgrid-Scale Stresses in Large-Eddy Simulation” Institute for Fluid Dynamics, ETH, Zurich, Switzerland, August 6, 1998.

“DNS of Transitional Hypersonic Boundary-Layer Flows on Straight and Flared Cones,” Fluid Mechanics Laboratory, Ecole Polytechnique University, Lausanne, Switzerland, August 10, 1998.

“Spatial Direct Numerical Simulation of Transitioning High-Speed Flows,” Department of Physics Colloquium, James Madison University, Nov. 15, 1996.

“Spatial Direct Numerical Simulation of Transitional High-Speed Flows,” presented at the Virginia Consortium of Engineering Schools Peninsula Graduate Seminar, March 10, 1995.

“Direct Numerical Simulation of Transitional High-Speed Flows,” Applied Science Seminar, Program in Applied Science, The College of William and Mary, March 1994.

“Spatial Direct Numerical Simulation for High-Speed Boundary-Layer Flows: The Devil is in the Details,” ICASE Colloquium delivered April 28, 1993, at NASA Langley Research Center, Hampton, VA.

“Direct Numerical Simulation of Laminar Breakdown in High-Speed Axisymmetric Boundary Layers,” presented at the Institut fuer Aerodynamik and Gasdynamik, University of Stuttgart, July 13, 1992.

“Direct Numerical Simulation of Laminar Breakdown in High-Speed Axisymmetric Boundary Layers,” presented at the Institut fuer Theoretische Stroemungsmechanik, DLR, Goettingen, Germany, July 16, 1992.

## **OTHER SIGNIFICANT SCHOLARLY, PROFESSIONAL, OR RESEARCH EXPERIENCE**

Attended week one of “High-Performance Computing Boot Camp,” on parallel computing, University of Virginia, Charlottesville, Virginia, August 7-10 and 13-16, 2007.

Attended “Boot Camp for Profs,” Colorado Mountain College (Timberline Campus), Leadville, CO, June 24-29, 2007.

Attendee of STARS (Science and Transcendence Advanced Research Series) Conference 1: Cosmology, Physics, and the Possibility of Life, Cancun, Mexico, January 4-8, 2007.

Attended MD/DC/VA regional meeting of the Mathematical Association of America (MAA), Hampden-Sydney and Longwood Colleges, Farmville, VA, November 3-4, 2006.

Served on review panel of the National Science Foundation for interdisciplinary grant proposals of category Course, Curriculum, Laboratory, and Instrumentation (CCLI), July 16-19, 2001.

Attended 2nd International Conference on Science and Consciousness, Albuquerque, NM, April 28-May 3, 2000.

Attended MD/DC/VA regional meeting of the Mathematical Association of America (MAA), James Madison University, Harrisonburg, VA, April 9-10, 1999.

ERCOFTAC Visitor, Institute for Fluid Dynamics, ETH (Swiss Federal Institute of Technology), Zurich, Switzerland, August 3-13, 1998.

Attended the 1998 Joint MAA/AMS Mathematics Meeting, Baltimore, MD, January 7-10, 1998.

Attended the 1996 American Society of Mechanical Engineers Fluids Engineering Division Annual Summer Meeting, San Diego, CA, July 8-11, 1996.

Attended MD/DC/VA regional meeting of the Mathematical Association of America (MAA), Randolph-Macon College, Ashland, VA, April 13, 1996.

Attended MD/DC/VA regional meeting of the Mathematical Association of America (MAA), Thomas Nelson Community College, Newport News, VA, April 7-8, 1995.

Attended ICASE/Langley Research Center Short Course on Turbulent Flow Modeling and Prediction, Newport News, VA, March 14-18, 1994.

Attended ICASE/Langley Research Center Short Course on Parallel Computation, Hampton, VA, July 26-30, 1993.

NSF sponsored attendee to the National Science Foundation/Boeing Computer Services Supercomputing Summer Institute, Seattle, WA, Aug. 4-30, 1985.

Researcher, numerical simulation of instability and transition in incompressible free shear flows, Institut A fuer Mechanik, Universitaet Stuttgart, Stuttgart, Federal Republic of Germany, Summer 1984.

## **ABSTRACTS, CONFERENCE PAPERS, PRESENTATIONS, AND CONTRACTOR REPORTS**

Dave Pruett, "On Teilhard, Entropy, and Love: A Unifying Vision," presented at the Visions of Integration: Implications for Self and Society, James Madison University, April 19-22, 2007.

C.D. Pruett, "At the Dawn of the Third Copernican Revolution: Perspectives from Teilhard," presented at Teilhard's Legacy: Rediscovering Fire, A Conference to Celebrate 50 Years of Teilhard Scholarship, Chestnut Hill College, PA, November 17-19, 2005.

C.D. Pruett, "Toward Configuration LES," presented at Euromech Colloquium 469: Large-Eddy Simulation for Complex Flows, held at Technical University Dresden, Germany, October 6-8, 2005.

C.D. Pruett, B.C. Thomas, C.E. Grosch, and T.B. Gatski, "A Temporal Approximate Deconvolution Model for LES," presented at the Fourth International Symposium on Turbulence and Shear Flow Phenomena (TSFP4), Williamsburg, VA, June 27-29, 2005.

C.D. Pruett, "Motivating Calc III by Celestial Mechanics," presented at Spring 2005 MAA MD-DC-VA Sectional Meeting, Charlottesville, VA, April 1-2, 2005.

C.D. Pruett, "Temporal Large-Eddy Simulation," presented at 2004 SIAM Annual Meeting, Portland, Oregon, July 11-14, 2004.

Joshua Blake and Dave Pruett, "Phase II and Beyond for Undergraduate Computational Science at JMU," presented

at SIGCSE04, Norfolk, VA, March 3-7, 2004.

C.D. Pruett, "Toward the De-Mystification of LES," in *DNS/LES: Progress and Challenges*, eds. C. Liu, L. Sakell, and T. Buetner, Proceedings of the Third AFOSR International Conference on DNS and LES, University of Texas, Arlington, TX, Aug. 5-9, 2001, Greyden Press, Columbus, OH, 2001.

W.H. Ingham, D.W. Peterson, C.D. Pruett, J.S. Sochacki, "Fluids and Computing for Undergraduates," poster presented at the 123rd AAPT National Meeting, Rochester, NY, July 23, 2001.

C.D. Pruett, poster session entitled "From Black Elk to Black Holes: Shaping a Myth for a New Millennium," presented at Interpreting Evolution: Scientific and Religious Perspectives, jointly sponsored by the AAAS, The Center for Theology and the Natural Sciences (CTNS), and the Philadelphia Center for Religion and Science (PCRS), Haverford College, June 14-19, 2001.

Dave Pruett and Jim Sochacki, "Undergraduate Computational Science via Computational Fluid Dynamics," MAA MD-DC-VA Section Meeting, VMI, Lexington, VA, April 20-21, 2001.

Dave Pruett, Anna Johnson, Chris Martin, Scott Ramsburg, and Jenn Shand, "From Black Elk to Black Holes: Shaping a Myth for the New Millennium," presented at the National Collegiate Honors Council 35th Annual Conference, Washington, DC, October 18-22, 2000.

Dave Pruett, Anna Johnson, Chris Martin, Scott Ramsburg, and Jenn Shand, "From Black Elk to Black Holes: Shaping a Myth for the New Millennium," opening address at the Virginia Collegiate Honors Council Spring Conference, Hampton University, VA, March 24-25, 2000.

C.D. Pruett, "Eulerian Time-Domain Filtering for Spatial LES," presented to the Computational Modeling and Simulation Branch, NASA Langley Research Center, Hampton, VA, July 13, 1999.

C.D. Pruett, "On Taylor-Series Approximations of Residual Stress," presented to the Computational Modeling and Simulation Branch, NASA Langley Research Center, Hampton, VA, July 12, 1999.

C.D. Pruett, "Eulerian Time-Domain Filtering for Spatial LES," in *Recent Advances in DNS and LES*, Eds. Doyle Knight and Leonidas Sakell, proceedings of the Second AFOSR International Conference on DNS/LES, Rutgers University, New Brunswick, NJ, June 6-9, 1999, Kluwer, 1999.

C.D. Pruett and C.G. Lyons, "Reinforcing Core Curricular Concepts," presented at the MD-DC-VA Sectional Meeting of the MAA, Spring 1998.

C.D. Pruett, "Toward Simplification of Dynamic Subgrid-Scale Models," in *Advances in DNS/LES*, Eds. Chaoqun Liu and Zhining Liu, proceedings of the First AFOSR International Conference on DNS/LES, Louisiana Tech University, Ruston, LA, Aug. 4-8, 1997.

C.D. Pruett, "Time-Domain Filtering for Spatial Large-Eddy Simulation," presented at the Third Symposium on Transitional and Turbulent Compressible Flows at the 1997 ASME Fluids Engineering Division Summer Meeting, Vancouver, BC, June 22-26, 1997.

C.D. Pruett, "Spatial Direct Numerical Simulation of Transitioning High-Speed Flows," *Transitional and Turbulent Compressible Flows-1995*, Eds. L.D. Kral, E.F. Spina, C. Arakawa, ASME FED-Vol. 224, 1995, pp. 63-70.

C.D. Pruett, "Spatial Direct Numerical Simulation of Transition in Hypersonic Flows," Final Report for AFOSR Grant F49620-95-1-0146, Jan. 1996.

C.D. Pruett, "Simulation of Crossflow Instability on a Supersonic Highly Swept Wing," NASA Contractor Report 198267, Oct. 1995.

C.D. Pruett, "A Spectrally Accurate Boundary-Layer Code for Infinite Swept Wings," NASA Contractor Report 195014, Dec. 1994.

C.D. Pruett and C.-L. Chang, "Transitional High-Speed Flow on a Cone: PSE versus DNS," in *Transition, Turbulence, and Combustion—Volume I: Transition* (Proceedings of the ICASE/LaRC Workshop on Transition, Turbulence, and Combustion, June 7-July 2, 1993, NASA Langley Research Center, Hampton, VA), edited by M.Y. Hussaini, Thomas B. Gatski, and T.L. Jackson, Kluwer, Boston, 1994.

C.D. Pruett and C.-L. Chang, "Spatial DNS of Laminar Breakdown on a Cone," presented at the 12th U.S. National Congress of Applied Mechanics, Seattle, WA, June 26-July 1, 1994.

C.D. Pruett and C.-L. Chang, "Direct Numerical Simulation of Laminar Breakdown in a Mach 6.8 Boundary-Layer Flow Along a Cone," presented at the 46th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, Albuquerque, NM, Nov. 21-23, 1993.

S.P.G. Dinavahi and C.D. Pruett, "Analysis of Direct Numerical Simulation Data of a Mach 4.5 Transitional Boundary-Layer Flow," in *Transitional and Turbulent Compressible Flows—1993* (Eds. L.D. Kral and T.A. Zang) ASME FED-Vol. 151, presented at the ASME Fluids Engineering Division Summer Meeting, Washington, D.C., June 20-23, 1993.

C.D. Pruett and C.-L. Chang, "A Comparison of PSE and DNS for High-Speed Boundary-Layer Flows," in *Transitional and Turbulent Compressible Flows—1993* (Eds. L.D. Kral and T.A. Zang), ASME FED-Vol. 151, presented at the ASME Fluids Engineering Division Summer Meeting, Washington, D.C., June 20-23, 1993.

C.D. Pruett and T.A. Zang, "Direct Numerical Simulation of Laminar Breakdown in High-Speed, Axisymmetric Boundary Layers," Proceedings of the *Thirteenth International Conference on Numerical Methods in Fluid Dynamics*, Rome, Italy, July 6-10, 1992, Springer-Verlag, 1993.

C.-L. Chang, B.A. Singer, S.P.G. Dinavahi, N.M. El-Hady, C.D. Pruett, J.E. Harris, C.L. Streett, T.A. Zang, and D.C. Wilcox, "Transition Region Modeling for Compressible Flow," presented at the AIAA Fourth International Aerospace Planes Conference, Orlando, Florida, Dec. 1-4, 1992, *NASP Contractor Report 1142*, Feb. 1993

C.D. Pruett, L.L. Ng, and G. Erlebacher, "On the Non-Uniqueness of the Parallel-Flow Approximation," *Instability, Transition, and Turbulence*, ed. M.Y. Hussaini, A. Kumar, and C.L. Streett, Springer-Verlag, 1992.

C.D. Pruett and T.A. Zang, "Direct Numerical Simulation of Laminar Breakdown in High-Speed, Axisymmetric Boundary Layers," *AIAA Paper No. 92-0742* presented at the AIAA 30th Aerospace Sciences Meeting, Reno, NV, Jan. 6-9, 1992.

C.D. Pruett and T.A. Zang, "Laminar Breakdown of High-Speed Boundary-Layer Flow," *NAS Technical Summaries—Numerical Aerodynamic Simulation Program March 1991—Feb. 1992*, p. 158.

C.D. Pruett, "On the Wall-Normal Velocity of the Compressible Boundary-Layer Equations," *NASA Contractor Report 4419*, 1991.

C.D. Pruett and T.A. Zang, "Direct Numerical Simulation of Laminar Breakdown in High-Speed, Axisymmetric Boundary Layers," presented at the 44th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, Scottsdale, AZ, Nov. 24-26, 1991.

C.D. Pruett, G. Erlebacher, and L.L. Ng, "Secondary Instability and Transition in Compressible Boundary Layers," *Twelfth International Conference on Numerical Methods in Fluid Dynamics: Proceedings of the Conference Held at the University of Oxford, England on 9-13 July 1990*, ed. K.W. Morton, Springer-Verlag, 1990.

L.L. Ng, G. Erlebacher, T.A. Zang, C.D. Pruett, "Compressible Secondary Instability Theory—Parametric Studies and Prospects for a Predictive Tool," presented by L.L. Ng at the 8th National Aero-Space Plane Technology Symposium, Monterey, CA, March 26-30, 1990.

C.D. Pruett, "Fast Numerical Simulation of a Periodically-Forced, Spatially-Evolving Mixing Layer" presented at AFOSR, NSF, & SIAM Conference on Recent Trends in Computational Mathematics and Mechanics, University of Pittsburgh, Pittsburgh, PA, March 9-11, 1988.

C.D. Pruett and H. F. Fasel, "Numerical Simulation of Transition Phenomena in Free Shear Layers," presented at the 39th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society, Columbus, OH, Nov. 23-25, 1986.

P.F. Bradley, P.M. Siemers, III, and C.D. Pruett, "Comparison of Forward Fuselage Space Shuttle Orbiter Flight Pressure Data to Wind-Tunnel and Analytical Results in the Hypersonic Mach Number Range," AIAA Pap. No. 81-2477, presented at the 1st Flight Testing Conference of AIAA/SETP/SFTE/ SAE/ITEA/IEEE, Las Vegas, NV, Nov. 11-13, 1981.

C.D. Pruett, H. Wolf, M.L. Heck, and P.M. Siemers III, "An Innovative Air Data System for the Space Shuttle Orbiter: Data Analysis Techniques," AIAA Pap. No. 81-2455 presented at the 1st Flight Testing Conference of AIAA/SETP/SFTE/SAE/ITEA/IEEE, Las Vegas, NV, Nov. 11-13, 1981.

## REFEREED PUBLICATIONS

C.D. Pruett, "Temporal Large-Eddy Simulation: Theory and Implementation," in "Special Issue of Large-Eddy Simulation of Complex Flows, eds. N.A. Adams and R.D. Moser, *Theoretical and Computational Fluid Dynamics*, Vol. 22, Nos. 3-4, May 2008, pp. 275-304 (online version DOI 10.1007, 2007).

C.D. Pruett, "Great Questions that have Changed the World," syllabus for *Honors in Practice*, Vol. 2, 2006, pp. 121-124.

C.D. Pruett, B.C. Thomas, C.E. Grosch, and T.B. Gatski, "A Temporal Approximate Deconvolution Model for LES," *Physics of Fluids*, Vol. 18 (028104), 2006, pp. 1-4.

C.D. Pruett, T.B. Gatski, C.E. Grosch, and W.D. Thacker, "The Temporally Filtered Navier-Stokes Equations: Properties of the Residual Stress," *Physics of Fluids*, Vol. 15, No. 8, 2003, pp. 2127-2140.

C.D. Pruett, J.W. Rudmin, and J.M. Lacy, "An Adaptive N-Body Algorithm of Optimal Order," *Journal of Computational Physics*, Vol. 187, 2003, pp. 298-317.

C.D. Pruett, J.S. Sochacki, and N.A. Adams, "On Taylor-Series Expansions of Residual Stress," *Physics of Fluids*, Vol. 13, No. 9, 2001, pp. 2578-2590.

C.D. Pruett, "On Eulerian Time-Domain Filtering For Spatial Large-Eddy Simulation," *AIAA Journal*, Vol. 38, No. 9, 2000, pp. 1634-1642.

C.D. Pruett and N.A. Adams, "A *Priori* Analysis of Three Subgrid-Scale Models for One-Parameter Families of Filters," *Physics of Fluids A*, Vol. 12, No. 5, 2000, pp. 1133-1142.

C.D. Pruett, C.L. Streett, and C.-L. Chang, "Simulation of Crossflow Instability on a Supersonic Highly Swept Wing," *Computers and Fluids*, Vol. 29, 2000, pp. 33-62.

C.D. Pruett and C.-L. Chang, "Direct Numerical Simulation of Hypersonic Boundary-Layer Flow on a Flared Cone," *Theoretical and Computational Fluid Dynamics*, Vol. 11, No. 1, 1998.

C.D. Pruett, "A Semi-Implicit Method for Internal Boundary Layers in Compressible Flows," *Computer Methods in Applied Mechanics and Engineering*, Vol. 137, 1996, pp. 379-393.

C.D. Pruett and T.A. Zang, "On Simulation and Analysis of Instability and Transition in High-Speed Boundary-Layer Flows," *Computing Systems in Engineering*, Vol. 6, No. 6, 1995.

C.D. Pruett and C.-L. Chang, "Direct Numerical Simulation of High-Speed Boundary-Layer Flows—Part II: Transition on a Cone in Mach 8 Flow," *Theoretical and Computational Fluid Dynamics*, Vol. 7, No. 5, 1995, pp. 397-424.

C.D. Pruett, T.A. Zang, C.-L. Chang, and M.H. Carpenter, "Direct Numerical Simulation of High-Speed Boundary-Layer Flows—Part I: Algorithmic Considerations and Validation," *Theoretical and Computational Fluid Dynamics*, Vol. 7, No. 1, 1995.

S.P.G. Dinavahi, C.D. Pruett, and T.A. Zang, "Direct Numerical Simulation and Data Analysis of a Mach 4.5 Transitional Flow," *Physics of Fluids A*, Vol. 6, No. 3, 1994.

C.D. Pruett, "On the Accurate Prediction of the Wall-Normal Velocity in Compressible Boundary-Layer Flow," *International Journal for Numerical Methods in Fluids*, Vol. 16, 1993.

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