

CHESTER E. GROSCH

EDUCATION

M.E. 1956 Stevens Institute of Technology Engineering
M.S. 1959 Stevens Institute of Technology Applied Mathematics
Ph.D 1967 Stevens Institute of Technology Physics-Fluid Dynamics

PROFESSIONAL POSITIONS

1973 to Present — Samuel L. & Fay M. Slover Professor of Oceanography, Old Dominion University
1982 to Present — Joint Appointment, Professor of Computer Science, Old Dominion University
1989 — Royal Society Guest Research Fellow, University of Cambridge, U.K.
1980 to 2000 — Consultant, Institute for Computer Applications in Science & Engineering (ICASE).
1972 — Visiting Fellow in Computational Physics, University of Reading, U.K.
1971 to 1973 — Chair, Dept. of Computer Science & Director Computer Center, Pratt Institute
1969 to 1973 — Associate Professor of Computer Science and Physics, Pratt Institute
1968 to 1969 — Scientist, Teledyne-Isotopes, Inc.
1968 to 1972 — Adjunct Assistant Professor of Ocean Engineering, Columbia University
1966 to 1968 — Research Associate, Hudson Laboratories, Columbia University
1961 to 1968 — Visiting Lecturer in Mathematics, Stevens Institute of Technology
1956 to 1966 — Research Scientist, Davidson Laboratory, Stevens Institute of Technology

AWARDS

2005 — Old Dominion University Distinguished Research Career Award.
1994 — NASA Group Achievement Award to the ICASE Fluid Mechanics Group.
1964 — Ottens Award for Excellence in Research, Stevens Institute of Technology.

JOURNAL ARTICLES

A.E. Tejada-Martinez, C.E. Grosch, A.E. Gargett, J.A. Polton, J.A. Smith and J.A. MacKinnon, "A hybrid spectral/finite-difference large-eddy simulator of turbulent processes in the upper ocean", *Ocean Modelling*, 30, 115-142, 2009.

A.E. Gargett, A.E. Tejada-Martinez and C.E. Grosch, "Measuring turbulent large-eddy structures with an ADCP. 1. Vertical velocity variance", *J. Marine Research*, 66, 157-189, 2008.

A.E. Tejada-Martinez, C.E. Grosch and T.B. Gatski, "Temporal large eddy simulation of unstratified and stably stratified turbulent channel flows", *Int. J. Heat & Fluid Flow*, 28, 1244-1261, 2007.

A.E. Tejada-Martinez and C.E. Grosch, "Langmuir turbulence in shallow water. Part 2. Large-eddy simulation", *J. Fluid Mechanics*, 576, 63-108, 2007.

C.C. Ebbesmeyer, W.J. Ingraham, T.C. Royer and C.E. Grosch, "Tub Toys Orbit the Pacific Subarctic Gyre", *EOS, Trans. American Geophysical Union*, 88, 1, 2007.

A.W. Trites, A.J. Miller, H.D.G. Maschner, M.A. Alexander, S.J. Bograd, J.A. Calder, A. Capotondi, K.O. Coyle, E. di Lorenzo, B.P. Finney, E.J. Gregr, **C.E. Grosch**, S.R. Hare, G.L. Hunt, J. Jahncke, N.B. Kachel, H-J. Kim, C. Ladd, N.J. Mantua, C. Marzban, W. Maslowski, R. Mendelssohn, D.J. Neilson, S.R. Okkonen, J.E. Overland, K.L. Reedy-Maschner, T.C. Royer, F.B. Schwing, J.X.L. Wang and A.J. Winship, "Bottom-Up Forcing and the Decline of Steller Sea Lions in Alaska: Assessing the Ocean Climate Hypothesis", *Fisheries Oceanography*, 16, 46-67, 2007.

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

B.L. Lipphardt, Jr., D. Small, A.D. Kirwan, Jr., S. Wiggins, K. Ide, **C.E. Grosch**, and J.D. Paduan, "Synoptic Lagrangian Maps: Application to Surface Transport in Monterey Bay", *J. Marine Research*, 64, 221-247, 2006.

T.C. Royer and **C.E. Grosch**, "Ocean Warming and Freshening in the Northern Gulf of Alaska", *Geophysical Research Letters*, 33, L16605, doi:10.1029/2006GL026767, 2006.

C. L. Rumsey, W. D. Thacker, T. B. Gatski and **C.E. Grosch**, "Analysis of Transition-Sensitized Turbulent Transport Equations", *AIAA Paper 2005-0523*, 16 pp, 2005.

C. D. Pruett, B. C. Thomas, **C.E. Grosch** and T. B. Gatski, "A Temporal Approximate Deconvolution model for LES", *Proceedings of the Fourth International Symposium on Turbulence and Shear Flow Phenomena*, Eds. J.A.C. Humphrey, T.B. Gatski, J.K. Eaton, R. Friedrich, N. Kasagi and M.A. Leschzimer, 2, 705-710, 2005.

A. E. Tejada-Martinez and **C.E. Grosch**, "The Structure of Turbulence in a Shallow Water Wind-Driven Shear Current with Langmuir Circulation", *Proceedings of the Fourth International Symposium on Turbulence and Shear Flow Phenomena*, Eds. J.A.C. Humphrey, T.B. Gatski, J.K. Eaton, R. Friedrich, N. Kasagi and M.A. Leschzimer, 1, 339-354, 2005.

N. Sarkar, T.C. Royer and **C.E. Grosch**, "Hydrographic and Mixed Layer Depth Variability on the Shelf in the Northern Gulf of Alaska, 1974-1998", *Continental Shelf Research*, 25, 2147-2162, 2005.

A. E. Gargett, J. R. Wells, A. E. Tejada-Martinez and **C.E. Grosch**, "Langmuir supercells: a dominant mechanism for sediment resuspension and transport", *Science*, 306, 1925-1928, 2004.

C. D. Pruett, T. B. Gatski, **C.E. Grosch** and W. D. Thacker, "Properties of the Residual Stress of the Temporally Filtered Navier-Stokes Equations" *Proceedings of the Third International Symposium on Turbulence and Shear Flow Phenomena*, 3, 947-952, 2003.

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*, 15, 2127-2140, 2003.

M. Toner, A.D. Kirwan, Jr., B.L. Lipphardt, A.C. Poje, C.K.R.T. Jones and **C.E. Grosch**, "Reconstructing Basin-Scale Eulerian Velocity Fields from Simulated Drifter Data", *Journal of Physical Oceanography*, 31, 1361-1376, 2001.

*T.C. Royer, C.E. Grosch and L.A. Mysak, "Interdecadal Variability of Northeast Pacific Coastal Freshwater and its Implication on Biological Productivity", *Progress in Oceanography*, 49, 95-111, 2001.*

*B.L. Lipphardt, A.D. Kirwan, Jr., C.E. Grosch, J.K. Lewis and J.D. Paduan, "Blending HF Radar and Model Velocities in Monterey Bay Through Normal Mode Analysis", *Journal of Geophysical Research, Oceans*, 105, 3425-3450, 2000.*

*W.D. Thacker, T.B. Gatski and C.E. Grosch, "Analyzing Mean Transport Equations of Turbulence and Linear Disturbances in Decaying Flows", *Physics of Fluids*, 11, 2626-2631, 1999.*

*L.P. Atkinson and C.E. Grosch, "Continental Runoff and Effects on the North Atlantic Ocean Subtropical Mode Water", *Geophysical Research Letters*, 26, 2977-2980, 1999.*

*W.D. Thacker, C.E. Grosch and T.B. Gatski, "Modeling the Dynamics of Ensemble-Averaged Linear Disturbances in Homogeneous Shear Flow", *Flow, Turbulence and Combustion*, 68, 39-58, 1999.*

B.L. Lipphardt, A.D. Kirwan, C.E. Grosch, L.M. Ivanov and J.K. Lewis, "Merging Disparate Oceanographic Data," In "Rapid Environmental Assessment", E. Pouliquen, A.D. Kirwan, Jr. and R.T. Pearson Eds., NATO SAACLANT Undersea Research Centre, 211-218, 1998.

*J.M. Seiner and C.E. Grosch "Mixing Enhancement by Tabs in Round Supersonic Jets", *AIAA Paper 98-2326*, 16 pp., 1998.*

*V. Interrante and C.E. Grosch, "Visualizing 3D Flow", *IEEE Computer Graphics and Applications*, 18, 49-53, 1998.*

*C.E. Grosch, J.M. Seiner, M.Y. Hussaini and T.L. Jackson "Numerical Simulation of Mixing Enhancement in a Hot Supersonic Jet", *Physics of Fluids*, 9, 1125-1143, 1997.*

*V. Interrante and C.E. Grosch, "Strategies for Effectively Visualizing a 3D Flow Using Volume Line Integral Convolution", *Proceedings of IEEE Visualization '97*, 421-424, 1997*

*A.D. Kirwan, C.E. Grosch and J.J. Holdzkom II "Particle-in-Cell Simulations of a Lens on an f-Plane", *Nonlinear Processes in Geophysics*, 4, 71-91, 1997.*

*F. Kozusko, C.E. Grosch, T.L. Jackson, C.A. Kennedy and T.B. Gatski "The Structure of Variable Property, Compressible Mixing Layers in Binary Gas Mixtures", *Physics of Fluids*, 8, 1945-1953, 1996.*

*F. Kozusko, D.G. Lasseigne, C.E. Grosch and T.L. Jackson "The Stability of Compressible Mixing Layers in Binary Gases", *Physics of Fluids*, 8, 1954-1963, 1996.*

*R. D. Joslin and C.E. Grosch "Growth Characteristics Downstream of a Shallow Bump: Computation and Experiment", *Physics of Fluids*, 7, 3042-3047, 1995.*

T.L. Jackson and C.E. Grosch, "Structure and Stability of a Laminar Diffusion Flame in a

Compressible, Three-Dimensional Mixing Layer”, *Theoretical and Computational Fluid Dynamics*, 6, 89-112, 1994.

D. Bhagavathi, **C.E. Grosch** and S. Olariu, ”A Greedy Hypercube-Labeling Algorithm”, *The Computer Journal*, 37, 124-128, 1994.

C.E. Grosch, ”Reacting Compressible Mixing Layers: Structure and Stability”, In ”*Combustion in High Speed Flows*”, J. Buckmaster, T.L. Jackson and A. Kumar Eds., Kluwer Publishing Company, 131-190, 1994.

M. Gaster, **C.E. Grosch** and T.L. Jackson ”The Velocity Field Created by a Shallow Bump in a Boundary Layer”, *Physics of Fluids*, 6, 3079-3085, 1994.

A. Dubey, M. Zubair and **C.E. Grosch**, ”A General Purpose Subroutine for Fast Fourier Transforms on a Distributed Memory Parallel Machine”, *Parallel Computing*, 20, 1697-1710, 1994.

D. Bhagavathi, W.M. Denny, **C.E. Grosch**, P.J. Looges and S. Olariu ”Sorting and Merging on the DAP”, *Computer Systems, Science and Engineering*, 9, 175-183, 1994.

F.Q. Hu, G.L. Lasseigne, T.L. Jackson, and **C.E. Grosch**, ”Induced Mach Wave - Flame Interactions in Laminar Supersonic Jets.”, *Physics of Fluids A*, 5, 422-427, 1993.

F.Q. Hu, D.G. Lasseigne, T.L. Jackson, and **C.E. Grosch**, ”Absolute/ Convective Instabilities and their Associated Wave Packets in a Compressible Reacting Mixing Layer”, *Physics of Fluids A*, 5, 901-915, 1993.

C.E. Grosch, T.L. Jackson, and A.K. Kapila, ”Nonseparable Eigenmodes of the Boundary Layer”, in *Instability, Transition and Turbulence*, M.Y. Hussaini, A. Kumar, and C.L. Streett Eds., Springer-Verlag, 127-136, 1992.

A. Dubey, M. Zubair, and **C.E. Grosch**, ”Real Fourier Transforms on a Massively Parallel Machine.”, *Int. J. Computer Systems Science and Engineering*, 7, 243-248, 1992.

M. Zubair, S.N. Gupta, and **C.E. Grosch**, ”A Variable Precision Approach to Speed-Up Iterative Schemes on Fine Grained Parallel Machines.”, *Parallel Computing*, 18, 1223-1231, 1992.

T.L. Jackson and **C.E. Grosch**, ”Inviscid Spatial Stability of a Compressible Mixing Layer. Part III. Effect of Thermodynamics.”, *J. Fluid Mech.*, 224, 159-175, 1991.

A. Dubey, M. Zubair, and **C.E. Grosch**, ”Computing the Fourier Transform of Real Data on a Hypercube.”, *J. Scientific Computing* 5, 293-309, 1991.

C.E. Grosch and T.L. Jackson, ”Inviscid Spatial Stability of a Three Dimensional Compressible Mixing Layer.”, *J. Fluid Mech.*, 231, 35-50, 1991.

C.E. Grosch and T.L. Jackson, ”Ignition and Structure of a Laminar Diffusion Flame in a Compressible Mixing Layer with Finite Rate Chemistry.”, *Physics of Fluids A*, 3, 3087-3097, 1991.

T.L. Jackson and C.E. Grosch, "Absolute/Convective Instabilities and the Convective Mach Number in a Compressible Mixing Layer.", *Physics of Fluids A*, 2, 949-954, 1990.

T.L. Jackson and C.E. Grosch, "On the Classification of Unstable Modes in Bounded Compressible Mixing Layers", *Instability and Transition*, M.Y. Hussaini and R.G. Voight, Eds., Springer-Verlag, 187-198, 1990.

M. Zubair, U.S. Shirahatti, T.L. Jackson and C.E. Grosch, "Solutions of Acoustic Field Problems Using Parallel Computers.", *Proc. Intl. Congress on Recent Developments in Air and Structure Borne Sound and Vibrations*, Auburn University, 903-908, 1990.

T.L. Jackson and C.E. Grosch, "Inviscid Spatial Stability of a Compressible Mixing Layer. Part II. The Flame Sheet Model.", *J. Fluid Mech.*, 217, 391-420, 1990.

C.E. Grosch, M. Ghose, S.N. Gupta, T.L. Jackson, and M. Zubair, "Massively Parallel Computation of the Euler Equations", *Proc. Fifth Distributed Memory Computing Conference*, IEEE Computer Society Press, 446-452, 1990.

S.N. Gupta, M. Zubair, and C.E. Grosch, "Simulation of Neural Networks on a Massively Parallel Computer (DAP-510) Using Sparse Matrix Techniques", *Proc. Third Symposium on the Frontiers of Massively Parallel Computation*, IEEE Computer Society Press, 376-379, 1990.

T.B. Gatski, C.E. Grosch, and M.E. Rose, "The Numerical Solution of the Navier-Stokes Equations for Three Dimensional, Unsteady, Incompressible Flows by Compact Schemes", *J. Comp. Physics*, 82, 298-329, 1989.

T.L. Jackson and C.E. Grosch, "Inviscid Spatial Stability of a Compressible Mixing Layer", *J. Fluid Mech.*, 208, 609-637, 1989.

M. Khorrami and C.E. Grosch, "Temporal Stability of Multiple Cell Vortices", *AIAA Paper 89-0987*, 7 pp, 1989.

T.L. Jackson and C.E. Grosch, "Effect of Heat Release and Equivalence Ratio on the Inviscid Spatial Stability of a Supersonic Reacting Mixing Layer", *Proc. Third Intl. Conf. on Numerical Combustion*, A. Dervieux & B. Larrouturou, Eds., Springer-Verlag, 362-373, 1989.

T.B. Gatski, C.E. Grosch, M.E. Rose, and R.E. Spall, "Numerical Simulation of Three-Dimensional Unsteady Vortex Flow Using a Compact Vorticity-Velocity Algorithm", *Proc. Seventh GAMM Conf. on Numer. Meth. in Fluid Mech.*, M. Deville, Ed., Vieweg, Braunschweig, 104-111, 1988.

R.A. Fatoohi and C.E. Grosch, "Implementation and Analysis of a Navier-Stokes Algorithm on Parallel Computers", *Proc. 1988 Intl. Conf. on Parallel Processing*, Vol. III, D.H. Bailey, Ed., Penn. State Univ. Press, 235-242, 1988.

C.E. Grosch, "Adapting a Navier-Stokes Code to the ICL-DAP", *SIAM J. Sci. & Stat. Comput.*, 8, s96-s117, 1987.

C.E. Grosch and *R.A. Fatoohi*, "An Implementation of a Barotropic Quasigeostrophic Model of Ocean Circulation on the MPP", in *Frontiers of Massively Parallel Scientific Computation*, *J.R. Fischer, Ed.*, 3-11, *NASA Conference Publication 2478*, 1987.

R.A. Fatoohi and **C.E. Grosch**, "Implementation of a Four Color Cell Relaxation Scheme on the MPP, FLEX/32, and CRAY/2", in *Proc. 1987 Intl. Conf. on Parallel Processing*, *S.K. Sahni, Ed.*, *Penn. State Univ. Press*, 424-426, 1987.

R.E. Spall, *T.B. Gatski*, and **C.E. Grosch**, "A Criterion for Vortex Breakdown", *Physics of Fluids*, 30, 3434-3440, 1987.

R.A. Fatoohi and **C.E. Grosch**, "Implementation of an ADI Method on Parallel Computers", *J. Scientific Computing*, 2, 175-190, 1987.

T.B. Gatski and **C.E. Grosch**, "Numerical Experiments on Boundary Layer Receptivity" in *Stability of Time Dependent and Spatially Varying Flow*, *D.L. Dwoyer and M.Y. Hussaini, Eds.*, 82-96, *Springer-Verlag*, 1986.

I.S. Oh and **C.E. Grosch**, "Numerical Study of Finite Amplitude Wave Refraction", *J. Waterway, Port, Coastal, & Ocean Eng.* 111, 78-95, 1985.

T.B. Gatski and **C.E. Grosch**, "A Numerical Study of the Two and Three Dimensional Unsteady Navier-Stokes Equations in Velocity-Vorticity Variables Using Compact Schemes", in *9th Intl. Conf. Num. Methods Fluid Dyn.*, *Springer-Verlag*, 235-239, 1985.

T.B. Gatski and **C.E. Grosch**, "Embedded Cavity Drag in Steady Laminar Flow", *AIAA Journal*, 23, 1028-1037, 1985.

T.B. Gatski, **C.E. Grosch**, and *M.E. Rose*, "A Numerical Study of Two-Dimensional Navier-Stokes Equations in Vorticity-Velocity Variables", *J. Comp. Physics*, 48, 1-22, 1982.

C.E. Grosch and *H. Salwen*, "Oscillating Stagnation Point Flow", *Proc. Roy. Soc. Lon.*, A, 384, 175-190, 1982.

H. Salwen and **C.E. Grosch**, "The Continuous Spectrum of the Orr-Sommerfeld Equation, II : Eigenfunction Expansions", *J. Fluid Mech.*, 104, 445-465, 1981.

J.C. Ludwick and **C.E. Grosch**, "Sediment Transport and Shoaling in Estuarine and Other Shallow-Water Areas", *Ocean. Sci. & Eng.*, 6, 163-194, 1981.

J.Y. Chung and **C.E. Grosch**, "Intermittency of Turbulent Transport in an Intermediate Layer", *Proc. 3rd Intl. Symp. Stochastic Hydraulics*, 765-772, 1980.

H. Salwen, *F.W. Cotton*, and **C.E. Grosch**, "Linear Stability of Poiseuille Flow in a Circular Pipe", *J. Fluid Mech.* 98, 273-284, 1980.

C.E. Grosch, "Performance Analysis of Poisson Solvers on Array Computers", *Supercomputers, Vol. 2*, *C.R. Jesshope and R.W. Hockney, eds. Infotech Intl.* 147-181, 1979.

C.E. Grosch and *H. Salwen*, "The Continuous Spectrum of the Orr-Sommerfeld Equation, I : The Spectrum and Eigenfunctions", *J. Fluid Mech.* 87, 33-54, 1978.

F.R. Weiman and **C.E. Grosch**, "Parallel Processing Research in Computer Science : Relevance to the Design of a Navier-Stokes Computer", *Proc. 1977 Intl. Conf. Parallel Proc.*, *J.L. Baer, ed.*, 175-182, *IEEE*, 1978.

G.T.F. Wong and **C.E. Grosch**, "A Mathematical Model for the Distribution of Dissolved Silicon in Interstitial Waters – An Analytical Approach", *J. Marine Res.* 36, 735-750, 1978.

C.E. Grosch, "Poisson Solvers on a Large Array Computer", *Proc. Los Alamos Sci. Laboratory Workshop on Vector and Parallel Processors*, *B.L. Buzbee and J.F. Morrison, eds.*, 93-132, 1978.

C.E. Grosch and *S.A. Orszag*, "Numerical Solution of Problems in Unbounded Regions : Coordinate Transforms", *J. Comp. Physics* 25, 273-295, 1977.

H. Salwen and **C.E. Grosch**, "The Stability of Poiseuille Flow in a Pipe of Circular Cross-Section", *J. Fluid Mech.* 54, 93-112, 1972.

C.E. Grosch and *H. Salwen*, "The Stability of Steady and Time-Dependent Plane Poiseuille Flow", *J. Fluid Mech.* 34, 177-205, 1968.

C.E. Grosch and *H. Salwen*, "Hydrodynamic Stability of a Modulated Shear Flow", *Phys. Rev. Letters* 18, 946-948, 1967.

H. Salwen, **C.E. Grosch**, and *S. Ziering*, "Extension of the Mott-Smith Method for a One-Dimensional Shock Wave", *Physics of Fluids* 7, 180-189, 1964.

C.E. Grosch, "Wave Boundary Layers - Theory", *Proc. Sym. on Dye Diffusion in the Ocean and Estuaries*, *Columbia Univ. Lamont Geo. Obs.*, 149, 1964.

C.E. Grosch and *S.J. Lukasik*, "Laminar Damping of Oscillatory Waves", *J. Hydraulics Div., Proc. Am. Soc. Civil Eng.*, 231-239, 1963.

S.J. Lukasik and **C.E. Grosch**, "Pressure-Velocity Correlations in Ocean Swell", *J. Geophys. Res.*, 68, 5689-5699, 1963.

C.E. Grosch, "Laminar Boundary Layer Under a Wave", *Physics of Fluids* 5, 1163-1167, 1962.

C.E. Grosch, *L.W. Ward*, and *S.J. Lukasik*, "Viscous Dissipation of Shallow Water Waves", *Physics of Fluids* 3, 477-478, 1960.

J.P. Breslin, **C.E. Grosch**, and *K.D. Larsen*, "Measurements of Local Hydrodynamic Shear Stress by the Use of Disk Thermistors", *Proc. 9th International Towing Tank Conference*, 1960.