

## Daniel J. Bodony

### Personal Information

Daniel Joseph Bodony	Assistant Professor, Aerospace Engineering
Date of Birth: May 10, 1975	Affiliate Professor, Mechanical Science and
United States Citizen	Engineering
bodony@uiuc.edu	306 Talbot Labs
Tel: +1 (217) 244-3844	104 S. Wright St.
Fax: +1 (650) 244-0720	Urbana, IL 61801

**Education** Stanford University, Ph.D. in Aeronautics and Astronautics, December, 2004. Advisor: Professor S. K. Lele.

Purdue University, M.S. in Aeronautics and Astronautics, December, 1999. Advisor: Professor G. A. Blaisdell.

Purdue University, B.S. in Aeronautics and Astronautics, May, 1997.

### Recent peer-reviewed publications

BODONY, D. J. (2006) Analysis of Sponge Boundary Treatments for Computational Fluid Mechanics, *J. Comp. Phys.*, Vol. 212, pp. 681–702.

BODONY, D. J. & LELE, S. K. (2006) Applications and results: Jet noise. *LES for Acoustics* (ed. C. Wagner, T. Hüttl & P. Sagaut). Cambridge Univ. Press, pp. 289–310.

BODONY, D. J. & LELE, S. K. (2005) On Using Large-Eddy Simulation for the Prediction of Noise from Cold and Heated Turbulent Jets. *Phys. Fluids*, Vol. 17, 085103.

### Pending peer-reviewed publications

BODONY, D. J. & LELE, S. K. (2007) On the current status of jet noise predictions using large-eddy simulation, under review by *AIAA J.*.

BODONY, D. J. & LELE, S. K. (2007) Low Frequency Sound Sources in High-Speed Turbulent Jets, under review by *J. Fluid Mech.*.

## Recent publications in conference proceedings

CHEUNG, L. C., BODONY, D. J., AND LELE, S. K. (2007) Noise radiation predictions from jet instability waves using a hybrid nonlinear PSE-acoustic analogy, AIAA Paper 2007-3638, *Presented at the 13th AIAA/CEAS Aeroacoustics Conference, Rome, Italy, 21–23 May.*

ELDREDGE, J. D., BODONY, D. J., AND SHOEYBI, M. (2007) Numerical Investigation of the Acoustic Behavior of a Multi-perforated Liner, AIAA Paper 2007-3683, *Presented at the 13th AIAA/CEAS Aeroacoustics Conference, Rome, Italy, 21–23 May.*

TALEI, M., BREAR, M. J., NICLOUD, F., BODONY, D. J., AND GIAUQUE, A. (2007) Transport of disturbance energy in hot and cold turbulent jets, AIAA Paper 2007-3638, *Presented at the 13th AIAA/CEAS Aeroacoustics Conference, Rome, Italy, 21–23 May.*

KHALIGHI, Y. AND BODONY, D. J. (2006) Improved near-wall accuracy for solutions of the Helmholtz equation using the boundary element method, Annual Research Briefs, Center for Turbulence Research, Stanford, CA, pp. 313–322.

NOVIKOV, A. AND BODONY, D. J. (2006) Multi-scale modeling of subgrid-scale stresses in the large-eddy simulation, *Proceedings of the 2006 Summer Program*, Center for Turbulence Research, Stanford, California, USA, pp. 99–109.

VASILYEV, O. V., GOLDSTEIN, D. E., STEFANO, G., BODONY, D., YOU, D. AND SHUNN, L. (2006) Assessment of local dynamic subgrid-scale models for stochastic coherent adaptive large eddy simulation, *Proceedings of the 2006 Summer Program*, Center for Turbulence Research, Stanford, California, USA, pp. 139–150.

BODONY, D. J. AND LELE, S. K. (2006) Low frequency sound sources in high-speed turbulent jets, Annual Research Briefs, Center for Turbulence Research, Stanford, CA, pp. 299–311.

ELDREDGE, J., SHOEYBI, M. AND BODONY, D. (2006) Numerical investigation of the acoustic behavior of a multi-perforated liner *Proceedings of the 2006 Summer Program*, Center for Turbulence Research, Stanford, California, USA, pp. 511–517.

CASALINO, D. AND BODONY, D. (2006) Green's function discretization of Pridmore-Brown wave operator *Proceedings of the 2006 Summer Program*, Center for Turbulence Research, Stanford, Califor-

nia, USA, pp. 547–558.

BODONY, D. J., RYU, J. AND LELE, S.K. (2006) Investigating broadband shock-associated noise of axisymmetric jets using large-eddy simulation, *Presented at the 12th AIAA/CEAS Aeroacoustics Conference, Cambridge, MA, 08–10 May*.

IHME, M., BODONY, D. J. AND PITSCH, H (2006) Prediction of combustion-generated noise in non-premixed turbulent jet flames using large-eddy simulation, AIAA Paper 2006-2614, *Presented at the 12th AIAA/CEAS Aeroacoustics Conference, Cambridge, MA, 08–10 May*.

NOVIKOV, A. AND BODONY, D. J. (2005) A multiscale, asymptotic model for the subgrid scale stresses in the large-eddy simulation of an incompressible fluid, Annual Research Briefs, Center for Turbulence Research, Stanford, CA, pp. 195–210.

BODONY, D. J. (2005) Developing a subgrid scale noise model for use with large-eddy simulations, Annual Research Briefs, Center for Turbulence Research, Stanford, CA, pp. 249–256.

IHME, M., BODONY, D. J. AND PITSCH, H. (2005) Towards the prediction of combustion-generated noise in turbulent non-premixed flames using large-eddy simulation, Annual Research Briefs, Center for Turbulence Research, Stanford, CA, pp. 311–323.

BODONY, D. J. (2005) The prediction and understanding of jet noise, Annual Research Briefs, Center for Turbulence Research, Stanford, CA, pp. 367–377.

BODONY, D. J. & LELE, S. K. (2005) Generation of Low-Frequency Sound in Turbulent Jets. AIAA Paper 2005-3041. *Presented at the 11th AIAA/CEAS Aeroacoustics Conference, Monterey, California, May 23–25*.

BODONY, D. J. & LELE, S. K. (2004) Jet noise prediction of cold and hot subsonic jets using large-eddy simulation. AIAA Paper 2004-3022, *Presented at the 10th AIAA/CEAS Aeroacoustics Conference, Manchester, U.K., May 10–12*.

BODONY, D. J. & LELE, S. K. (2003) Large-Eddy Simulation of Jet Engine Exhaust Noise. *Theme ERCOFTAC Bulletin No. 58: Aeroacoustics*, pp. 21–24.

BODONY, D. J. & LELE, S. K. (2003) A Stochastic Subgrid Scale

Noise Model for Noise Predictions of Subsonic Jets. AIAA Paper 2003-3252, *Presented at the 9th AIAA/CEAS Aeroacoustics Conference*, Hilton Head, South Carolina.

BODONY, D. J. & LELE, S. K. (2002) Large Eddy Simulation of Turbulent Jets and Progress Towards a Subgrid Scale Noise Model. *Proceedings of International Workshop on "LES for Acoustics,"* DGLR-Report-2002-03, October 7–8, 2002, Göttingen, Germany.

FREUND, J. B., BODONY, D. J. & LELE, S. K. (2002) Turbulence interactions leading to far-field jet noise. *Proceedings of the 2002 Summer Program*, Center for Turbulence Research, Stanford, California, USA.

BODONY, D. J. & LELE, S. K. (2002) Spatial Scale Decomposition of Shear Layer Turbulence and the Sound Sources Associated with the Missing Scales in a Large-Eddy Simulation. AIAA Paper 2002-2454, *Presented at the 8th AIAA/CEAS Aeroacoustics Conference*, Breckenridge, Colorado.

BODONY, D. J. & MACISAAC, D. L. (1996) Development of a digitized video experiment for introductory physics. *Amer. Assoc. Phys. Teachers Announcer* **25** (4), 72.

### **Invited Talks**

BODONY, D. J. (2006) "Sound generation and prediction in complex environments." Presented at University of Illinois, Urbana-Champaign. May 22.

BODONY, D. J. (2006) "Sound generation and prediction in complex environments." Presented at Washington University, St. Louis, MO. May 5.

BODONY, D. J. & LELE, S. K. (2006) "Aeroacoustic Prediction of Turbulent Jets Using Large-Eddy Simulation," Presented at the 44th Aerospace Sciences Meeting and Exhibit. Reno, Nevada. January 10.

BODONY, D. J. (2005) "Acoustics and Sound Generation," University of Michigan, Ann Arbor, Michigan. Dec 15.

BODONY, D. J. (2005) "On the Acoustic Prediction of Turbulent Flows," Center for Turbulence Research, Stanford, California. March 4.

BODONY, D. J. (2005) "On the Acoustic Prediction of Turbulent Flows,"  
Theoretical and Applied Mechanics, Univ. Illinois at Urbana-Cham-  
paign, January 27.

### **Professional & Research Experience**

- 2006– Assistant Professor, Aerospace Engineering Department, University of Illinois at Urbana-Champaign.
- 2006– Affiliate Professor, Mechanical Science and Engineering Department, University of Illinois at Urbana-Champaign.
- 2005–2006 Research Associate, Center for Turbulence Research, Stanford University.
- 2004–2005 Post-doctoral Research Fellow, Center for Turbulence Research, Stanford University.
- 1999–2004 Graduate research assistant, Stanford University. Advisor: Professor S. K. Lele. Aeroacoustic prediction of turbulent free shear flows.
- 2002 Center for Turbulence Research summer research fellow, Stanford University. Advisor: Professor S. K. Lele. Role of very-large-scale motions in jet noise.
- 1998 Summer research fellow, AFRL, Wright-Patterson AFB. Advisor: USAF Capt. Joel Luker. Aeroelastic fluid-structure interactions on the F-18C wing.
- 1997–1999 Graduate research assistant, Purdue University. Advisor: Professor G. A. Blaisdell. Turbulence model computations of a turbulent axial vortex.
- 1996–1997 Researcher, Innovative Aerodynamic Technologies. Advisor: Jeff K. Viken. Natural laminar flow around light aircraft. NASA Langley SBIR.
- 1993–1996 Undergraduate research assistant, Purdue University Department of Physics. Advisors: Professors E. Shibata and Daniel L. MacIsaac. Developed curricula for digital video-based physics learning.

### **Academic Experience**

- 2007 AE312 Compressible Fluid Dynamics (Junior AE students), AE433 Aerospace Propulsion (Senior AE students)

- 2003 ME131B Compressible Flow and Turbomachinery, Stanford University. Teaching assistant and lecturer for Professor S. K. Lele
- 1998–1999 Graduate student member of student academic dispute panel, Purdue University.
- 1997–1998 AAE333L Experimental Aerodynamics, Purdue University. Teaching assistant for Professor S. P. Schneider.
- 1997–1998 AAE334L Compressible Experimental Aerodynamics, Purdue University. Teaching assistant for Professor S. P. Schneider.
- 1996–1997 PHYS152L Introduction to Physics Laboratory, Purdue University. Teaching assistant for Professor E. Shibata.

### **Awards, Grants, and Service**

- Reviewer, *Intl. J. Aeroacoustics*, *J. Comp. Physics*, *Theor. Comp. Fluid Dyn.*, *Phys. Fluids*, *AIAA J.*, *ASME J. Fluid Eng.*
- 2010 Organizer, Aeroacoustics sessions, AIAA Aerospace Sciences Meeting & Exhibit, Orlando, FL.
- 2007 Aeroacoustics Research Consortium (AARC), PI, ‘Liner Eduction Methodology Using Large-eddy Simulation,’ \$101,000<sup>1</sup>.
- 2007–2010 NASA, co-PI with Samimy (OSU) & Freund (UIUC), ‘Supersonic jet noise control with plasma actuators,’ \$206,000.
- 2007–2011 NASA, subaward from Pitsch (Stanford), ‘Detailed Modeling of Combustion Noise Using a Combined Large-Eddy Simulation/Computational Aeroacoustics Model, \$250,000.
- 2007–2010 NASA, subaward from Lele (Stanford), ‘Noise prediction and modeling of supersonic jet noise using large-eddy simulation,’ \$230,000.
- 2007 Incomplete list of teachers ranked as excellent, UIUC.
- 2007 Who’s Who in Engineering Education.
- 2007– AIAA Aeroacoustics Technical Committee (Member).
- 2005–2007 American Physical Society Forum on Graduate Student Affairs Member-at-Large.

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<sup>1</sup>Dollar figure quoted is DJB’s budget.

- 2002–2005    Aeroacoustics Research Consortium (AARC), co-author with Professor S. K. Lele. Budget of \$150,000 for ‘Hybrid Prediction Methods of Broadband Jet Noise.’ Renewed Annually.
- 2003–2004    Achievement Rewards for College Scientists (ARCS) Foundation Scholarship, \$20,000.
- 2001            Department of Defense DURIP (AFOSR), co-author with Professor S. K. Lele and Dr. M. F. Barone. Budget of \$94,635 for ‘48 Processor Computing Cluster for Large Scale Turbulence Simulation.’
- 1998–2001    Department of Defense Science and Engineering Graduate Fellowship.
- 1998            Purdue University Magoon Award for Excellence in Teaching.
- 1998            Air Force Office of Scientific Research Summer Graduate Research Program.
- 1997            William Koerner Scholarship, Purdue University.
- 1996            AIAA Region III Student Paper Competition, Third Place Undergraduate Division, with Professor G. A. Blaisdell
- 1996            Boeing Company Scholar

Urbana, IL, USA, August 16, 2007