

Rick Damiani, Ph.D., P.E.
RRD Engineering

WORK EXPERIENCE:

- 2011 National Wind Technology Center, NREL, Golden, CO.
Senior Engineer. Wind Turbine Aeroelastic Structural Model Development:
Aero-Mechanical Design and Analysis of new offshore Wind Turbine Technologies and Composite Structures; FEA and Structural Dynamics modeling.
- 2009-2011 Knight Piésold and Co., Denver, CO.
Associate Engineer. Head of Wind Energy Division- Technical Leader for Renewables:
Structural Engineering: Aero-Mechanical Design and Analysis of new Wind Turbine Technologies and Composite Structures; FEA and Structural Dynamics modeling; Large Wind Resource Assessment and Development; evaluated more than 500 MW in wind assets. Community Wind Development and Wind-Diesel Hybrid Power Plant Design in Alaska Villages.
- 2007-2009 CPP Wind, Inc., Fort Collins, CO.
Senior Engineer. Wind Energy Group Head.
Wind Power: Large, Small Wind Design; WRA & Wind Development (evaluated 500+MW in wind assets). Structural Engineering: Wind Loads on Architectural Structures, Solar Troughs; Small Wind Turbine Design, Composite Design, Analysis, and Testing. Dispersion Study Consulting.
- 2007-current RRD Engineering, Lakewood, CO.
Principal Engineer.
Wind Power, Mechanical and Structural Engineering. Small Wind Turbine Aeroelastic Design and Analysis. Variable geometry VAWT Composite Design and Analysis. Wind Resource Assessment. Evaluation of Convective Mine-Shaft Power Extraction Devices. Design of Mechanical Cranes and Hoists, Pump-support Moment Frames, Instrumentation Towers. Wind Turbine Testing for IEC/AWEA Standards Certification. Flutter Analysis for Aeronautical Structures. Experience with Standards: IEC61400; AISC 360-05/314; ASCE 7-05; IBC2006.

- 2005-2006 University of Wyoming, Laramie, WY.
Research Associate, Aviation Facility Engineering Director.
Boundary Layer Fluid-Dynamics and Cloud-Physics, Remote-Sensing. CuPIDO project Co-PI (NSF \$500,000 grant awarded). Wind Analysis and Resource Assessment. Turbulence investigation within the Planetary Boundary layer. Supervision of the Aviation Facility Engineering: Airframe Fatigue Life Assessment; STC Modification Preliminary Design including Stress Analysis of Airframe Proposed Modifications.
- 2001-05 University of Wyoming, Laramie, WY.
Airframe Engineer, Research Assistant.
Aviation Facility Engineer. Atmospheric Fluid-Dynamics Research Emphasis on Dual-Doppler Radar Synthesis of Wind Flow in the Boundary Layer. Research on the Effects of Turbulent Flow across Wind Turbine Rotors.
- 2000-01 TEA-Systems-PES (Energy Tech Center and Petroleum Engineering Systems), Pisa, Italy-Aberdeen, Scotland.
System Design Engineer.
Oil Extraction Control-Valve Fluid-Dynamics and Optimization Design; Halliburton-PES Smart Well Completion. CFD and Lab Testing Design and Optimization.
- 03-08/2000 General Electric, New Products Engineering, Schenectady, NY - Florence, Italy.
Design Engineer.
Design and Evaluations of Cooling Systems for Gas Turbines. FEA and Stress Analysis of Casing, Shroud; Rotor Dynamics.
- 1998-2000 CPR (Pisa Research Consortium), Pisa, Italy.
Research Engineer.
Development of Computational_Models for the study of air-ocean interface, ASPEN (Air-Sea Processes and Environmental Change), EU Project No. ENV4-CT97-0460. FEA Analysis of Aeronautical Structures; Airframe Aeroelastic Analysis for the Double Delta-wing.
- 1999-current Franchi Consulting, Gruppo Edimo.
Structural Engineering Consultant.
Design of Machine Components, Composites, Girder Beams, Reinforced and Pre-Stressed Concrete Structures. Clients: IKEA, Pirelli, Italian Dept. of Transportation, S.A.C.B.O. Spa Airports.

VISITING POSITIONS:

- 09-12/1999 Chemical Engineering Department, UC Santa Barbara, Santa Barbara, CA.
Research Engineer. Development of LES Subgrid-Scale Models for "Turbulence and Shear Flows".

EDUCATION:

- Ph.D.,** 1999, ***Aeronautical Engineering*** (summa cum laude), University of Pisa, Italy
(GPA: 3.9, full scholarship recipient)
- Ph.D.,** 2005, ***Atmospheric Science***, University of Wyoming, Laramie, WY
- B.S. , M.S.,** 1996, ***Aeronautical Engineering***, University of Pisa, Italy
(GPA: 3.9, full scholarship recipient)

ADDITIONAL COURSES:

- Wind Turbine Tower and Foundation System Design, Dr. Tinjum, Lasse Nowack (Vestas Wind Systems A/S), University of Wisconsin Madison, WI 2010*
- Numerical Approximations for P.D.E., Dr. Francois Beux, 09/1998-03/1999, Scuola Normale Superiore, Pisa, Italy.*
- Computational Fluid and Structural Dynamics, Dr. M.V.Salvetti, 03-05/1999, Scuola Normale Superiore, Pisa, Italy.*
- Fundamentals of Stabilized Methods for Partial Differential Equations with Emphasis on Fluid-Dynamics, Dr. T. J. R. Hughes (Stanford University), 04/1999, Scuola Normale Superiore, Pisa, Italy.*

CAREER-RELATED SKILLS:

- Experienced with FEM/CFD codes and DNS/LES simulations, aerodynamic analysis and design, structural analysis
- Experienced with software packages: WindPro, WaSP, Matlab, IDL, MathCad, AutoCad, Pro-Engineer, Office
- Experienced with structural/CFD codes: ANSYS, NuMAD, FAST, SAP2000, AeroDyn, STRAND7, Fluent, StarCD
- Excellent programming skills and knowledge of different computer languages: FORTRAN, PASCAL, VISUAL-BASIC, C
- Experienced with different platforms and operating systems: UNIX/LINUX, WINDOWS
- Languages: English, Italian, Spanish

PROFESSIONAL ACTIVITIES AND MEMBERSHIPS:

- P.E. License: European Licensed Engineer, 1999
Colorado P.E., since 2008
Member of ASME, since 2009
Member of NSPE, since 2009
Reviewer for: Journal of Wind Engineering and Industrial Aerodynamics; Journal of Fluid Mechanics; IEEE Trans. Geoscience and Remote Sensing; AMS Journals
P.I. CuPIDO project, NSF \$500K proposal awarded

INVITED TALKS:

- 04-2010 Wind Technology Applications, SME, Broadmoor, Colorado Springs, CO
07-2009 Wind For Mines, Anglo-Gold Ashanti, Barrick, CO

- 11-06-2007 Wind Energy Overview, Poudre School District, Fort Collins, CO
 06-06-2007 Wind Energy Development: Wind Resource Assessment, Summit, SD
 02-06-2007 Wind Energy and Sustainable Buildings, Front Range Community College, Fort Collins, CO
 12-08-2005 Airframe Fatigue Design, Damage Tolerance or Intolerable Damage?, University of Wyoming, Laramie, WY.
 04-11-2005 CuPIDO: Cumulus Convection and Dynamics Over Orography. University of Arizona, Tucson, AZ.
 10-07-2005 Thermals Observed by an Airborne dual-Doppler Radar. NCAR seminar series, Boulder, CO.

TEACHING AND ADVISING:

- 2004-2005 Assistant Professor, Thermodynamics, M.E. Dept., University of Wyoming
 2000 Dissertation committee external member, Dr. L. Antico's M.S. Thesis, Chemical Engineering, University of Pisa, Pisa, Italy
 1999 Dissertation committee external member, Dr. G. Tamburrano's M.S. Thesis, Aeronautical Engineering, University of Pisa, Pisa, Italy
 1997-98 Tutor, Statics and Dynamics, University of Pisa, Pisa, Italy

PUBLICATIONS:

- Damiani, R. and B. Cochran, 2009, **Wind Resource Assessment in Complex Terrain**, WindTech International, (5) 3, Jul
 Cochran, B. and R. Damiani, 2009, **Harvesting Wind Power from Tall Buildings**, WindTech International, (5) 2, May/Jun
 Damiani, R., B. Cochran, R. Petersen, 2009, **Assessing the Wind Resource in Complex Environments**, EUEC conference 2009, Phoenix, June 1-4
 Damiani, R., B. Cochran, R. Petersen, 2009, **Wind Loading Assessment for Solar Energy Applications**, EUEC conference 2009, Phoenix, June 1-4
 Damiani, R., B. Cochran, K. Orwig, J. Peterka, 2008, **Complex Terrain: A Valid Wind Option ?**, WindPower 2008, Houston June 1-4, AWEA, poster session
 B. Cochran, Damiani, R., 2008, **Integrating Wind Energy into the Design of the Houston Discovery Tower**, WindPower 2008, Houston June 1-4, AWEA
 J. Peterka, K. Orwig, Damiani, R., B. Cochran, 2008, **Design Wind Loads for Wind Power Applications**, WindPower 2008, Houston June 1-4, AWEA
 Damiani, R., J. Zehnder, B. Geerts, J. Demko, S. Haimov, J. Petti, G.S. Poulos, A. Razdan, J. Hu, M. Leuthold,, 2008, **Cumulus Photogrammetric, In-situ and Doppler Observations: The CuPIDO 2006 Experiment**, Bull. Amer. Meteor. Soc., 89(1), 57-73
 Grubišić, V., Armi, L., Kuettner, J., Haimov, S., Oolman, L., Damiani, R., and B. Billings, 2006, **Atmospheric rotors: Aircraft in situ and cloud radar measurements in T-REX**, 12th Mountain Meteorology Conference, CD-ROM, Santa Fe, NM. 8/28-9/1, AMS.

- Damiani, R. and G. Vali, 2007, **Evidence for tilted toroidal circulations in cumulus**, *J. Atmos. Sci.*, **64**(6), 2045-2060.
- Damiani, R., Vali, G. and S. Haimov, 2005, **Airborne dual-Doppler radar observations of horizontal velocity fields in growing cumulus**, *32nd Conf. on Radar Meteorology*, CD-ROM, 1R.6
- Damiani, R., Vali, G. and S. Haimov, 2005, **High-Resolution airborne radar dual-Doppler technique**, *32nd Conf. on Radar Meteorology*, CD-ROM, P1R.4
- Damiani, R., Vali, G. and S. Haimov, 2005, **The structure of thermals in cumulus from airborne dual-Doppler radar observations**, *J. Atmos. Sci.*, **(63)**, 1432–1450.
- Damiani, R. and S. Haimov, 2006, **A high-resolution dual-Doppler technique for fixed multi-antenna airborne radar**, *IEEE Trans. Geosci. Remote Sensing*, **(42)** 12, 3475-3489.
- Geerts, B. and R. Damiani, 2006, **Fine-scale vertical structure of a cold front as revealed by airborne radar**, *Mon. Wea. Rev.*, **(134)**, 251-271.
- Geerts, B. and R. Damiani, 2005, **Quand les insectes d'evolient les ascendances**, *Aerial*, January (39), 27-33.
- Damiani, R., S. Haimov and G. Vali, 2004, **Velocity Fields in Cumulus Derived from Airborne Dual-Doppler Measurements**, *14th International Conference on Clouds and Precipitation - ICCP2004*, Bologna, Italy, 18-23 July 2004.
- Geerts, B., D. Leon, S. Haimov, and R. Damiani, 2002, **Airborne Doppler radar observations of convective plumes and radar 'fine-lines'**, *2nd European Radar Meteorology Conference*, EGS, Delft, Netherlands, 18-22 November, ERAD02-A-00007
- Salveti M.V., Damiani R., Beux F., **3D coarse large-eddy simulations of the flow above two-dimensional sinusoidal waves**, *Int. J. Num. Meth. Fluids*, **(34)**, (2001)
- Salveti M.V., Damiani R., Beux F., 2001, **Drag prediction over steep sinusoidal wavy surfaces**, *Phys. Fluids*, **(13)** 9
- Damiani R., Beux F., Salvetti M.V., 2000, **Large Eddy Simulations of stratified flows above wavy Surfaces**, *Atti del Dipartimento di Ingegneria Aerospaziale di Pisa*, ADIA 2000-2
- Damiani R., Beux F., Salvetti M.V., 1999, **Large Eddy Simulation above wavy Surfaces**, *Atti del Dipartimento di Ingegneria Aerospaziale di Pisa*, ADIA 99-3