

Jay Apt

POSITIONS HELD

Carnegie Mellon University

PROFESSOR, TEPPER SCHOOL OF BUSINESS 2010 — PRESENT
CO-DIRECTOR, CARNEGIE MELLON ELECTRICITY INDUSTRY CENTER
AFFILIATED PROFESSOR IN ENGINEERING & PUBLIC POLICY

ASSOCIATE RESEARCH PROFESSOR, TEPPER SCHOOL OF BUSINESS 2003 — 2010
EXECUTIVE DIRECTOR, CARNEGIE MELLON ELECTRICITY INDUSTRY CENTER
DISTINGUISHED SERVICE PROFESSOR IN ENGINEERING AND PUBLIC POLICY 2000 — 2010

iNetworks, LLC Venture Capital

MANAGING DIRECTOR AND CHIEF TECHNOLOGY OFFICER 2000 — 2003

Carnegie Museum of Natural History

DIRECTOR 1997 — 2000

National Aeronautics and Space Administration

ASTRONAUT 1985 — 1997
FOUR SPACE SHUTTLE MISSIONS. TWO MISSIONS INVOLVED PARTNERSHIPS WITH JAPAN AND RUSSIA; ONE INVOLVED TWO SPACEWALKS.

CHIEF OF MISSION SUPPORT BRANCH 1995 — 1996

FLIGHT CONTROLLER, MISSION CONTROL CENTER 1982 — 1985

California Institute of Technology

1980 — 1982

Jet Propulsion Laboratory, Pasadena, California

SCIENCE MANAGER OF OPTICAL FACILITIES, TABLE MOUNTAIN OBSERVATORY
GROUP LEADER, OPTICAL ASTRONOMY GROUP
PLANETARY SCIENTIST IN EARTH AND SPACE SCIENCES DIVISION

HARVARD UNIVERSITY

ASSISTANT DIRECTOR, DIVISION OF APPLIED SCIENCES 1978 — 1980
FOUNDING DIRECTOR, PLANETARY IMAGING COMPUTER CENTER

STAFF, CENTER FOR EARTH AND PLANETARY PHYSICS 1976 — 1980

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

1976

POST-DOCTORAL FELLOW IN LASER SPECTROSCOPY

EDUCATION

A.B. IN PHYSICS (MAGNA CUM LAUDE), HARVARD, 1971
PH.D. IN EXPERIMENTAL ATOMIC PHYSICS, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, 1976. ADVISOR: DAVID PRITCHARD
THESIS TITLE: "VELOCITY DEPENDENCE OF EXCITATION TRANSFER IN COLLISIONS OF LASER-EXCITED ATOMS"

P R O F E S S I O N A L M E M B E R S H I P S

INTERNATIONAL ASSOCIATION FOR ENERGY ECONOMICS
SOCIETY FOR RISK ANALYSIS
INDUSTRY STUDIES ASSOCIATION
INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS
AMERICAN GEOPHYSICAL UNION
AMERICAN PHYSICAL SOCIETY
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE
ASSOCIATION OF SPACE EXPLORERS

B O A R D S

VISIONS OF TOMORROW FOUNDATION (2011-PRESENT)
INDUSTRY STUDIES ASSOCIATION (2012-2014)
 EARLY CAREER DEVELOPMENT COMMITTEE – BOARD LIAISON
ELECTRIC POWER RESEARCH INSTITUTE (EPRI) (2007-2013)
 AUDIT COMMITTEE
PHIPPS CONSERVATORY AND BOTANIC GARDENS (1998-2009)
 CHAIR, FINANCE COMMITTEE
 AUDIT COMMITTEE
NATIONAL ASSOCIATION OF ROCKETRY (1998-2007)

C U R R E N T A D V I S O R Y C O M M I T T E E S

CHAIR, SCIENTIFIC ADVISORY COMMITTEE, FUTURE RESILIENT SYSTEMS PROGRAM,
NATIONAL UNIVERSITY OF SINGAPORE/ETH-ZURICH (2015 – PRESENT)

S E L E C T E D H O N O R S A N D A W A R D S

OUTSTANDING REVIEWER, *ENVIRONMENTAL RESEARCH LETTERS* (2016)
FELLOW, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE (2013)
FELLOW, THE EXPLORERS CLUB (2008)
METCALF AWARD FOR OUTSTANDING ENGINEERING ACHIEVEMENT (2002)
DAVID L. LAWRENCE AWARD OF VECTORS / PITTSBURGH (2000)
NASA DISTINGUISHED SERVICE MEDAL (1997)
NASA EXCEPTIONAL SERVICE MEDAL (1993 AND 1995)
FEDERATION AERONAUTIQUE INTERNATIONALE V.M. KOMAROV DIPLOMA FOR
 OUTSTANDING ACHIEVEMENTS IN THE FIELD OF EXPLORATION OF OUTER SPACE
 (1991 AND 1992), SERGEI P. KOROLEV DIPLOMA FOR A NON-PLANNED REPAIR OF
 A BROKEN DEVICE TO MAKE POSSIBLE THE CONTINUATION OF A MISSION (1991),
 AND DE LA VAULX MEDAL (1998)

ARCHIVAL JOURNAL PAPERS

106. Klima, K., H. Sridhar, V. Dash, M.D. Bharadwaj, P. Kumar, and J. Apt, *Are Local Weather Data Required to Predict Annual Solar PV Plant Performance in India?* In Review at the ASME Journal of Solar Energy Engineering.
105. Kaack, L.H., J. Apt, M.G. Morgan, and P. McSharry, *Empirical Prediction Intervals Improve Energy Forecasting*. In revision after first review at Proceedings of the National Academy of Sciences of the United States of America.
104. Fisher, M.J. and J. Apt, *Emissions and Economics of Behind-the Meter Electricity Storage*. Revised and resubmitted after first review at Environmental Science & Technology.
103. Clack, C. T. M., S. A. Qvist, J. Apt, S. J. Davis, V. Diakov, M. Handschy, P. Hines, P. Jaramillo, D. M. Kammen, M. G. Morgan, J. F. Whitacre, J. Sweeney, D. G. Victor, G. R. Tynan, J. C. S. Long, V. Sivaram, A. Brandt, J.P. Weyant, and K. Caldeira, *Evaluation of the Jacobson et al. energy system modeling studies*. In review at Proceedings of the National Academy of Sciences of the United States of America.
102. Fisher, M.J., F. Sowell, and J. Apt, *The economics of commercial demand response for spinning reserve*. In Press at Energy Systems.
101. Handschy, M.A., S. Rose and J. Apt, *Is It Always Windy Somewhere? Occurrence of Low-Wind-Power Events over Large Areas*. Renewable Energy, 2017. **101**: 1124-1130.
100. Bandi, M. and J. Apt, *Variability of the wind turbine power curve*. Applied Sciences, 2016. **6**: 262.
99. Keen, J.F. and J. Apt, *Are high penetrations of commercial cogeneration good for society?* Environmental Research Letters, 2016. **11**: 124014.
98. Rose, S. and J. Apt, *Quantifying Sources of Uncertainty in Reanalysis Derived Wind Speed*. Renewable Energy, 2016. **94**: 157-165.
97. Lueken, R., K. Klima, W.M. Griffin, and J. Apt, *The Climate and Health Effects of a USA Switch from Coal to Gas Electricity Generation*. Energy, 2016. **109**: 1160-1166.
96. Lueken, R., J. Apt and F. Sowell, *Robust Resource Adequacy Planning in the Face of Coal Retirements*. Energy Policy, 2016. **88**: 371-388.
95. Rose, S. and J. Apt, *What Can Reanalysis Data Tell Us About Wind Power?* Renewable Energy, 2015. **83**: 963-969.
94. Klima, K. and J. Apt, *Geographic Smoothing of Solar PV: Results from Gujarat*. Environmental Research Letters, 2015. **10**: 104001.
93. Apt., J., *Recent results on the integration of renewable electric power into the US grid*. MRS Energy & Sustainability - A Review Journal. 2015. **2**: E6.

92. Dowds, J., P. Hines, T. Ryan, W. Buchanan, E. Kirby, J. Apt, and P. Jaramillo, *A Review of Large-Scale Wind Integration Studies*. Renewable & Sustainable Energy Reviews, 2015. **49**: 768-794.
91. Moore, J., K. Borgert and J. Apt, *Could Low Carbon Capacity Standards Be More Cost Effective at Reducing CO₂ than Renewable Portfolio Standards?* Energy Procedia, 2014. **63**: 7459-7470.
90. Moore, J. and J. Apt, *Consumer Cost Effectiveness of CO₂ Mitigation Policies in Restructured Electricity Markets*. Environmental Research Letters, 2014. **9**: 104019.
89. Lueken, R. and J. Apt, *The Effects of Bulk Electricity Storage on the PJM Market*. Energy Systems, 2014. **5**(4): 677-704.
88. Hittinger, E., J. Apt, and J. Whitacre, *The Effect of Variability-Mitigating Market Rules on the Operation of Wind Farms*. Energy Systems, 2014. **5**(4): 737-766.
87. Fertig, E., A.M. Heggedal, G. Doorman, and J. Apt, *Optimal investment timing and capacity choice for pumped hydropower storage*. Energy Systems, 2014. **5**(2): 285-306.
86. Rose, S. and J. Apt, *The Cost of Curtailing Wind Turbines for Secondary Frequency Regulation Capacity*. Energy Systems, 2014. **5**(3): 407-422.
85. Rose, S., P. Jaramillo, M. Small, and J. Apt, *Quantifying the Hurricane Catastrophic Risk to Offshore Wind Power*. Risk Analysis, 2013. **33**(12): 2126-2141.
84. Mauch, B., J. Apt, P.M.S. Carvalho and M. Small, *An Effective Method for Modeling Wind Power Forecast Uncertainty*. Energy Systems, 2013. **4**(4): 393-417.
83. Siler-Evans, K., I.L. Azevedo, M.G. Morgan, and J. Apt, *Regional Variations in the Health, Environmental, and Climate Benefits of Wind and Solar Generation*. Proceedings of the National Academy of Sciences of the United States of America, 2013. **110**(29): 11768-11773.
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80. Mauch, B., J. Apt, P.M.S. Carvalho and P. Jaramillo, *What Day-Ahead Reserves are Needed in Electric Grids with High Levels of Wind Power?*. Environmental Research Letters, 2013. **8**: 034013.
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71. Fertig, E., J. Apt, P. Jaramillo, and W. Katzenstein, *The effect of long-distance interconnection on wind power variability*. Environmental Research Letters, 2012. **7**(3): 034017.
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47. Wilson, E.J., M.G. Morgan, J. Apt, M. Bonner, C. Bunting, M. de Figueiredo, J. Gode, C. Jaeger, D.W. Keith, S.T. McCoy, R.S. Haszeldine, M. Pollak, D.M. Reiner, E.S. Rubin, A. Torvanger, C. Ulardic, S. Vajjhala, D. Victor, and I. Wright, *Regulating the Geological Sequestration of Carbon Dioxide*. Environmental Science & Technology, 2008. **42**(8): 2718-2722.

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41. Patiño-Echeverri, D., B. Morel, J. Apt, and C. Chen, *Should a Coal-Fired Power Plant be Retrofitted or Replaced?* Environmental Science & Technology, 2007. **41**(23): 7980-7986.
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37. Lave, L.B. and J. Apt, *Planning for Natural Disasters in a Stochastic World*. Journal of Risk and Uncertainty, 2006. **33**: 117-130.
36. Apt, J. and B. Fischhoff, *Power and People*. The Electricity Journal, 2006. **19**(9): 17-25.
35. Apt, J., L.B. Lave, and M.G. Morgan, *Power Play: A More Reliable U.S. Electric System*. Issues in Science & Technology, 2006. **22**(4): 51-58.
34. Blumsack, S., J. Apt, and L.B. lave, *Response to Andy Ott's letter on "Lessons from the Failure of U.S. Electricity Restructuring"*. The Electricity Journal, 2006. **19**(5): 4-6.
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32. Dobesova, K., J. Apt, and L.B. Lave, *Are renewables portfolio standards cost-effective emission abatement policy?* Environmental Science & Technology, 2005. **39**(22): 8578-8583.
31. Blumsack, S., J. Apt, and L. Lave, *A Cautionary Tale: U.S. Electricity Reform*. Economic and Political Weekly (Special Issue: Power Sector Reform - International Experience), 2005. **40**(50): 5279-5290.
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24. Talukdar, S., J. Apt, M. Ilic, L. Lave, and M.G. Morgan, *Cascading Failures: Survival vs. Prevention*. The Electricity Journal, 2003. **16**(9): 25-31.
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BOOKS

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- Morgan, M.G., S.T. McCoy, J. Apt, M. Dworkin, P. Fischbeck, D. Gerard, K.A. Gregg, R.L. Gresham, C.R. Hagan, D.M. Kreis, R.R. Nordhaus, E.R. Pitlick, M. Pollak, J.L. Reiss, E.S. Rubin, K. Twaite, and E.J. Wilson, Carbon Capture and Sequestration: Removing the Legal and Regulatory Barriers. 2012, New York: RFF Press. 274 pp.
- Bol, M. and J. Apt, North South East West: American Indians and the Natural World, 1998, Roberts Rinehart, Boulder. 158 pp.

Apt, J., M.R. Helfert, and J. Wilkinson, Orbit: NASA astronauts photograph the Earth. 1996, Washington, D.C.: National Geographic Society. 223 pp.

BOOK CHAPTERS

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