Curriculum Vitae
Gerald W. Recktenwald
September 2020

Education

Ph.D.	1989	Mechanical Engineering, University of Minnesota
M.S.	1985	Mechanical Engineering, University of Minnesota
B.S.	1980	Mechanical Engineering, Cornell University

Employment

2015 – present	Associate Professor, Mechanical and Materials Engineering Department Portland State University, Portland, Oregon
2006 – 2015	Chair, Mechanical and Materials Engineering Department Portland State University, Portland, Oregon
1994 – present	Associate Professor, Mechanical Engineering Department Portland State University, Portland, Oregon
1989 – 1994	Assistant Professor, Mechanical Engineering Department Portland State University, Portland, Oregon
1987 – 1989	Mechanical Engineering and Computer Consultant Interlaken Technology Corporation, Minneapolis, Minnesota
1981 – 1987	Research and Teaching Assistant, Mechanical Engineering Department University of Minnesota, Minneapolis, Minnesota
1980 – 1981	Advanced Development Engineer, Carlyle Compressor Division United Technologies Corporation, Syracuse, New York

Dissertation

"A Study of Heat Transfer Between the Walls and Gas Inside the Cylinder of a Reciprocating Compressor", co-advisors James W. Ramsey and Suhas V. Patankar

Refereed Publications or Other Creative Achievements

Books

G.W. Recktenwald, **Numerical Methods with MATLAB: Implementations and Applications**, 2000, Prentice-Hall, Upper-Saddle River, NJ.

Journal Articles

Andrew Glick, Sarah E. Smith, Naseem Ali, Juliaan Bossuyt, Gerald Recktenwald, Marc Calar, Raúl Bayoán Cal, "Influence of flow direction and turbulence intensity on heat transfer of utility-scale photovoltaic solar farms", Solar Energy, 207(2020):173–182, doi.org/10.1016/j.solener.2020.05.061.

Andrew Glick, Naseem Ali, Juliaan Bossuyt, Gerald Recktenwald, Marc Calaf Raúl Bayoán Cal, "Infinite photovoltaic solar arrays: Considering flux of momentum and heat transfer", Renewable Energy, 156(2020):791–803, doi.org/10.1016/j.renene.2020.03.183.

Dylan Botham-Myint, Gerald W. Recktenwald and David J. Sailor, "Thermal footprint effect of rooftop urban cooling strategies", Urban Climate, 14(2015): 268–277.

Refereed Conference Proceedings

Antonie J. Jetter and Gerald W. Recktenwald, "Fostering Student Innovators through Small Prototyping Grants–Student engagement in the Beta Program", Proceedings of the 2017 ASEE Annual Conference and Exposition, Columbus, OH, June 24-28, 2017, https://peer.asee.org/28383.

Branimir Pejcinovic, Melinda Holtzmann, Philip K. Wong, and Gerald Recktenwald, "Assessing student preparedness for introductory engineering and programming courses", Frontiers of Engineering Conference, Indianapolis, IN, October 18-21, 2017, IEEE, ISBN: 978-1-5090-5919-5.

Gerald W. Recktenwald, "Six years of living with the lab", Proceedings of the 2016 ASEE Annual Conference and Exposition, New Orleans, LA, June 26-29, 2016, DOI 10.18260/p.25811, https://peer.asee.org/25811.

Gerald W. Recktenwald, "BYOE: A desktop apparatus for demonstrating convective heat transfer", Proceedings of the 2016 ASEE Annual Conference and Exposition, New Orleans, LA, June 26-29, 2016, DOI 10.18260/p.26420, https://peer.asee.org/26420.

Taylor Sharpe, Geng Qin, Gerald W. Recktenwald, "A compact device for inductive instruction in general physics", Proceedings of the 2015 ASEE Annual Conference and Exposition, Seattle, WA, June14-17, 2015, DOI: 10.18260/p.23362.

B. Pejcinovic, D. Duncan, P.K. Wong, M. Faust, G. Recktenwald, "Assessment of student preparedness for freshman engineering courses through assessment of math background", Proceedings of the 2014 Frontiers in Education Conference, 22-25 October 2014, Madrid, Spain.

Gerald W. Recktenwald and David E. Hall, "Using Arduino as a platform for programming, design and measurement in a freshman engineering course", Proceedings of the 2011 ASEE Annual Conference and Exposition, 26-29 June 2011, Vancouver, BC, American Society for Engineering Education.

Gerald Recktenwald and Bob Edwards, "Guided Inquiry Laboratory Exercises Designed to Develop Qualitative Reasoning Skills in Undergraduate Engineering Students", Proceedings of the 2010 Frontiers in Education Conference, 28-30 October 2010, Arlington, Virginia.

Gerald Recktenwald, Robert Edwards, Jenna Faulkner, Douglass Howe, "Student attitudes toward inquiry-based exercises in undergraduate lab courses". Paper AC 2010-1169, 2010 ASEE Annual Conference and Exposition. Louisville, KY, 20-23 June 2010, American Society for Engineering Education.

Gerald Recktenwald, Robert Edwards, Jenna Faulkner, Douglass Howe, "An inquiry-based exercise involving a tank of water with a hole in its side". Paper AC 2010-1174, 2010 ASEE Annual Conference and Exposition. Louisville, KY, 20-23 June 2010, American Society for Engineering Education.

Robert Edwards, Gerald Recktenwald, "A guided-inquiry approach to teaching fan selection". Paper AC 2010-208, 2010 ASEE Annual Conference and Exposition. Louisville, KY, 20-23 June 2010, American Society for Engineering Education.

Gerald Recktenwald, Robert Edwards, Douglass Howe, Jenna Faulkner, and Calvin Hsieh, "The Engineering of Everyday Things: Simple experiments for the thermal and fluid sciences". Paper AC 2009-704, 2009 ASEE Annual Conference and Exposition. Austin, TX, American Society for Engineering Education.

Robert Edwards and Gerald Recktenwald, "Simple experiments for the thermal and fluid sciences", paper number AC 2009-712, 2009 ASEE Annual Conference and Exposition. Austin, TX, American Society for Engineering Education.

Robert Edwards, Gerald Recktenwald and Brian Benini, "A laboratory exercise to the the hydrostatic principle as a core concept in fluid mechanics", paper number AC 2009-951, 2009 ASEE Annual Conference and Exposition. Austin, TX, American Society for Engineering Education.

Gerald Recktenwald, Robert Edwards, Douglas Howe, and Jenna Faulkner, "A simple experiment to expose misconceptions about the Bernoulli equation", paper IMECE2009-10964, 2009 ASME International Mechanical Engineering Congress and Exposition. Lake Buena Vista, FL, 13-19 November 2009, American Society of Mechanical Engineers.

Calvin Hsieh, Gerald Recktenwald, and Bob Edwards, “Implementing inquiry-based experiments in a fluid science laboratory class”, paper AC 2008-1351, ASEE Annual Conference and Exposition, 22-25 June 2008, Pittsburgh, PA.

Bob Edwards and Gerald Recktenwald, "Guided-inquiry in an engineering technology classroom", paper AC 2008-293, ASEE Annual Conference and Exposition, 22-25 June 2008, Pittsburgh, PA.

Gerald Recktenwald and Bob Edwards, “Using Simple Experiments to Teach Core Concepts in the Thermal and Fluid Sciences”, Gerald Recktenwald and Bob Edwards, paper AC 2007-2294, ASEE Annual Conference and Exposition, 24-27 June 2007, Honolulu, HI. (Winner of an Outstanding Paper Award from the Division of Experimental and Laboratory Oriented Studies).

Bhaskar Bhatnagar and G. W. Recktenwald “Design of the Inlet for an Open Circuit Wind Tunnel for Testing Full Scale Class Eight Trucks”, paper FEDS 2004-56354 at 2004 ASME Heat Transfer/Fluids Engineering Summer Conference Charlotte, North Carolina, 11-15 July 2004.

Sergey L. Kernazhitskiy and G. W. Recktenwald “Numerical Modelling of a Large Quench Tank”, paper FEDS 2004-56419 at 2004 ASME Heat Transfer/Fluids Engineering Summer Conference Charlotte, North Carolina, 11-15 July 2004.

J.M. Leland, and G.W. Recktenwald, “Optimization of Phase Change Heat Sink for Extreme Environments”, in *Proceedings of SEMITHERM XIX*, pp. 351–356, Santa Clara, CA, 11-13 March 2003, IEEE, Piscataway, NJ.

G.W. Recktenwald, “Prediction of Device Temperatures with Depth-Averaged Models of the Flow Field Over Printed Circuit Boards”, in *Cooling and Thermal Design of Electronic Systems*, pp. 129–136, C. Amon, ed., HTD-Vol. 319, 1995, ASME, New York.

G.W. Recktenwald, “Using the PCBCAT to Model Convective Heat Transfer from Electronic Devices on Printed Circuit Boards”, in *Cooling and Thermal Design of Electronic Systems*, pp. 137–144, C. Amon, ed., HTD-Vol. 319, 1995, ASME, New York.

G.W. Recktenwald and P. Gotseff, “A Visualization Tool for CFD Models of Convectively Cooled Printed Circuit Boards”, Proceedings of 1995 ASME National Heat Transfer Conference, vol. 9, G. Vradis, and K.A. Woodbury, eds., 1995, ASME, New York.

Ma, Y. and G.W. Recktenwald “Simplified simulation of convective heat transfer from an array of heated blocks in a rectangular channel”, in *Advances in Electronic Packaging 1993*, Proceedings of the 1993 ASME International Electronics Packaging Conference, P.A. Engel, and W.T. Chen, eds., 1993, ASME, New York.

G.W. Recktenwald, and P. Butler, “Depth-averaged modeling of convective heat transfer from printed circuit boards”, ASME paper no. 91-WA-EEP-36, presented at the 1991 ASME Winter Annual Meeting, December, Atlanta, GA.

G.W. Recktenwald, J.W. Ramsey, and S.V. Patankar, “The impact of piston-induced flow on hysteresis loss on Helium-filled gas springs”, in *Numerical Heat Transfer*, ASME HTD-Vol. 130, K.Vafai and J.L.S. Chen (eds.), presented at AIAA/ASME Thermophysics and Heat Transfer Conference, Seattle, WA, June 1990.

G.W. Recktenwald, J.W. Ramsey, and S.V. Patankar, “Toward robust implementation of SIMPLE-based algorithms for unsteady and highly turbulent flows”, in *Forum on Unsteady Flow*, ASME FED-vol.83, P.H. Rothe (ed.), 1989.

S.V. Patankar, K.A. Kelkar, and G.W. Recktenwald, "Microcomputer software for heat transfer education", Proceedings of 1987 IBM Academic Information Systems University Conference, Boston, MA, June 1987.

G.W. Recktenwald, J.W. Ramsey, and S.V. Patankar, “Predictions of heat transfer in compressor cylinders”, Proceedings of the 1986 International Compressor Engineering Conference at Purdue University, with J.W. Ramsey and S.V. Patankar.

Non-Refereed Publications or Other Creative Achievements

Recktenwald, G. W., *Take-apart, hack and design: Repurposing an ink-jet printer for prototyping in mechanical design* Paper presented at 2019 ASEE PNW Section Conference, Corvallis, Oregon. March 2019, https://peer.asee.org/31895

Recktenwald, G. W., *Invention Bootcamp: Teaching Design, Prototyping and Invention to High School Students* Paper presented at 2019 ASEE PNW Section Conference, Corvallis, Oregon, March 2019. https://peer.asee.org/31885

Antonie Jetter, Gerald Recktenwald, James McNames, Christopher Clark and Don Mueller, *Fostering student innovators through small prototyping grants – Lessons from the Innovation Program at Portland State University*, VentureWell 2017 Open Conference, 23-26 March 2017, Washington, DC.

Gerald Recktenwald, Jenna Faulkner, Calvin Hsieh and Robert Edwards, *Using a blender to teach qualitative reasoning with the first law of Thermodynamics*, Poster presented at the AAAS-NSF CCLI Conference, 13-15 August 2008, Washington, DC.

S.S. Berger and G.W. Recktenwald, "Development of an Improved Model for Piezo-Electric Driven Ink Jets", *Proceedings of IS&T NIP 19 International Conference on Digital Printing Technologies*, Society for Imaging Science and Technology, Sept. 28–Oct. 3, 2003, New Orleans, Louisiana.

Honors, Grants, and Fellowships

$297,486, The Lemelson Foundation, Invention Bootcamp, 1 September 2019 – 31 August 2021, Co-PI with Dr. James Hook, (MCECS Associate Dean and PSU Computer Science).

$295,659, The Lemelson Foundation, Invention Bootcamp, 1 September 2017 – 30 September 2019, Co-PI with Dr. James Hook, (MCECS Associate Dean and PSU Computer Science).

$173,650, National Integrated Cyber Education Research Center/US Department of Homeland Security, for PSU Cyberdiscovery Camp, 1 September 2014 through 31 July 2015, *Co-PI* Gerald Recktenwald with PI Dr. Lois Delcambre (PSU Computer Science), PSU Grant 276881.

$39,954, Columbia River Economic Development Council/Jobs Innovation & Accelerator Challenge, Applied Engineering Internship Cohort for New Product Development, 20 November 2013 through 30 September 2014. PI Gerald Recktenwald, PSU Grant 277017.

$152,949, National Integrated Cyber Education Research Center/US Department of Homeland Security, for PSU Cyberdiscovery Camp, 1 October 2013 through 29 August 2014, *Co-PI* Gerald Recktenwald with PI Dr. Lois Delcambre (PSU Computer Science), PSU Grant 276880.

$75,000, Intel Corporation, "Flow and Heat Transfer Around a Laptop", 1 January 2010 through 31 December 2010, PI Gerald Recktenwald, Senior Personnel: Raul Cal, PSU Grant 411480.

$150,000, National Science Foundation Division of Undergraduate Education (Award # 0633754). "The Engineering of Everyday Things – Laboratory Exercises in the Thermal and Fluid Sciences", 1 April 2007 through 31 March 2010. PI Gerald Recktenwald, Co-PI Bob Edwards, PSU Grant 221980.

$15,078, Office of Naval Research STTR, "Patient Warming Device for Casualty care", 1 May 2005 through 31 December 2005, PI Gerald Recktenwald, PSU Grant 271726.

$34,972, Office of Naval Research STTR, "Patient Warming Device for Casualty care", 1 July 2004 through 30 April 2005. PI Gerald Recktenwald, PSU Grant 271725.

$40,000, Freightliner, LLC, Aerodynamic Design of a Wind Tunnel for Testing of Full Scale, Class Eight Trucks, 1 July 2002 through 30 June 2003, PI Gerald Recktenwald, PSU Grant 410775.

$35,010, ESCO Corporation and Oregon Metals Initiative, Optimization of Flow in a Quench Tank, 1 July 2002 through 30 June 2003, PI Gerald Recktenwald, PSU Grant 414208 (ESCO) plus OMI match.

$34,500, ESCO Corporation and Oregon Metals Initiative, CFD Modeling of Flow in a Quench Tank, 1 July 2001 through 30 June 2002, PI Gerald Recktenwald, PSU Grant 4142806 (ESCO) plus OMI match.

$11,444, US Army Corps of Engineers, CFD Modeling of Flow in the Intake of a Turbine in the Dalles Dam, August 2001-December 2001, PI Gerald Recktenwald, PSU Grant 221980.

$30,000, Oregon Joint Schools of Engineering, Internal funds and release time for development of modeling expertise to support research in Microscale Energy and Chemical Systems. Joint effort with Oregon State University, September 2000—June 2002

$25,000, Tektronix Inc. CPID Division, Development of an experimental technique for measuring the lumped, fluid dynamic characteristics of orifices used in ink jet printers. January—December 1996, PSU Budget number 411795/90-262-9342.

$35,200, Intel Corporation, "Depth-Averaged Modeling of Convective Heat Transfer from Printed Circuit Boards–Phase 3", July 1992, PSU account number 90-262-9232, principal investigator.

$35,000, Intel Corporation, "Depth-Averaged Modeling of Convective Heat Transfer from Printed Circuit Boards–Phase 2", July 1991, PSU account number 90-262-9231, principal investigator.

$55,055, National Science Foundation, Research Initiation Award, "Development of an Implicit CFD Algorithm for Distributed Memory Parallel Computers", June 1991, NSF Grant number ASC-9110831, PSU account number 90-262-4045, principal investigator.

$35,000, Intel Corporation, "Depth-Averaged Modeling of Convective Heat Transfer from Printed Circuit Boards–Phase 1", July 1990, PSU account number 90-262-9230, principal investigator.

$70,946, Tektronix, Inc., "Workstations and X-terminals for Research in Civil and Mechanical Engineering", 6 December 1989, principal investigator on behalf of Mechanical and Civil Engineering Departments.

Other Research and Creative Achievements

US Patent Application 11/419,186, "Heating System to Alleviate Hypothermia", filed on 5/18/2006, co-inventor with Wayne Fields, Mel Campf, Habib Homayoun, Jack Robinson, Larry Crawshaw and Gary Mills

Other Teaching, Mentoring and Curricular Achievements

Outstanding Teaching Award, Mechanical Engineering Department, 1999-2000 and 2002-2003

New courses created: ME 120, *Introduction to Engineering*, ME 121, *Introduction to Sensors and Controls*, ME 370, The Mechanical Engineering Profession, ME 352, *Numerical Methods in Engineering*, ME 448 *Applied CFD*, ME 449 *Thermal Management Measurements*

Community Outreach

Advisory Boards

Mt. Hood Community College, Engineering Technology Advisory Committee, June 2015 to present.

Foundation for Family Science, Board Member, Fall 2009 to Fall 2013,
http://integraonline.com/~familyscience.org/, 4614 SW Kelly Ave, Suite 100, Portland, OR 97239

Consulting

Kolisch Hartwell, P.C., Intellectual Property Attorneys, Fall 2005

Zess Technologies, Portland, Oregon, 2001-2002

Western Pulp Products, Corvallis, Oregon, 2001

FLIR, Portland, Oregon, 2000

Cascade Microtech, Beaverton, Oregon, 2000

Anthony Ross Company, Inc., Beaverton, Oregon, 1990, 1998

Edan Engineering, Inc., Vancouver, WA 1998
Tektronix, Inc., Graphics Print Engine Division, Portland, Oregon, 1991-1992
Oregon Museum of Science and Industry, Portland Oregon, 1991-1992, gratis
Avia Group, International, Inc., Portland, Oregon, 1991

Education Outreach

Getting Started with IoT for Research and Teaching, presented at the 2018 ASEE Annual Conference and Exposition, Salt Lake City, UT, 24 June 2018, in collaboration with Jeff Branson of SparkFun and Hans Scharler of the Mathworks.

Your Head in the Clouds: Hands-on Workshop on Using IoT Devices as Teaching Aids, presented at the 2017 ASEE Annual Conference and Exposition, Columbus, OH, June 24-28, 2017, in collaboration with Jeff Branson of SparkFun and Hans Scharler of the Mathworks.

Introduction to the Arduino Microcontroller, workshop presented at the 2012 ASEE Annual Conference and Exposition, 10 June 2012, San Antonio, TX, presented with David Hall Allie DeLeo, Mikey Swanbom and Heath Tims, Louisian Tech University

Engineering of Everyday Things – Guided Inquiry Labs, workshop presented at the 2010 Frontiers in Education Conference, Arlington VA, 27 October 2010, presented with Bob Edwards of Penn State-Erie.

One-day Saturday Academy Summer Workshop (part of week-long high school engineering camp) 2008, 2009, 2010, 2011.

Expert Reviewer for the Family Engineering Program, Research and Curriculum Development project involving the American Society of Engineering Education, Michigan Technological University, and David Heil and Associates, Sponsored by the National Science Foundation, April-May 2010.

Mentor for Saturday Academy ASE Scholar, Darnell Peterson, July-August 2009

Judge at the Portland Regional FIRST Robotics Competition (March 2006, 2007, 2009, 2010)

Member of Senior Thesis committee for Charles Reel, a senior student at Pacific Crest Community School in Southeast Portland, Fall 2008

Mentor for Lego Robotics Team at Bridger Creative Science School, Fall 2005, Fall 2006

Mentor/Internship supervision for Mark Delcambre, student at Merlo Station High School, Winter and Spring 2006

Mentor to International Baccalaureate Student Zoni Rockoff, Columbia River High School in Vancouver, WA, Fall 2005 to Winter 2006

Advisor to Elliot Williams's Senior Dissertation Project for Pacific Crest Community School, Fall 2003 – Winter 2004

Professional Development Activities

Workshops

Living with the Laboratory, *2009 Summer Workshop,* Louisiana Tech University, 12-15 July 2009, Sponsored by the National Science Foundation

Cyberinfrastructure and Engineering Education Workshop, 4-5 September 2008, National Science Foundation, Arlington Virginia

Lattice Boltzmann Methods, 26-28 March 2010, Institute of Fluid Mechanics, University of Erlangen, Erlangen Germany.

Governance Activities for the University, College and Department

University

Library Committee, 2018-2020

Institutional Assessment Council, 2014-2015

Faculty Senate, 2000-2002, 2005-2007, 2009-2010, 2012-2014, 2016-2018

Committee on Committees 2012-2014

Graduate Program Board, 2012-2016

Oregon University System Committee on Credit for Prior Learning, 2012-2013

Provost Search Committee, Fall 2004 - Spring 2005. Service during Winter/Spring 2005 occurred during sabbatical.

Oregon Space Grant Representative, Fall 2003 to 2011

Urban Portfolio Project, Faculty Advisory Committee, 1998-2002

PSU Assessment Working Group, 2000-2001

University Grievance Committee, Fall 2000

Academically-Controlled Auxiliary Activities Committee, 1992-1997, Chair of Committee 1994-1997

College

Beta Program (was Innovation Program) 2011-2019

Diversity Equity and Inclusion Committee, 2017-2020

Search Committee for Dean of the Maseeh College, 2008–2009

Member of University Search Committee for two positions in Materials Science: 2008-2009

Search Committee for Chief Accounting and Budget Officer, Summer 2006

Reviewer of ONAMI proposals for Tactical Energy Systems, February 2005, November 2006.

College of Engineering Applied Science Advisory Committee on Computing, 1999-2001

Curriculum Committee, 1999-2001

Administrative Representative to NorthWestNet, 1990-1991

Department

MME Strategic Vision Committee, 2017-2019

Chair of Department, Fall 2006 - 2015

Chair of ME Department Search Committee for three positions in Thermal and Fluid Science: 2000-2001, 2001-2002, 2003-2004

Member of Search Committee for position in Electronic Packaging, 1999-2000

ABET Committee, 2002-Fall 2004, consultant to committee 2016-2019

Webmaster and database code developer, 2001-present

Faculty member of ME Department Advisory Board, 2000-2002

ME Curriculum Committee, 1999-2001

Promotion and Tenure Committee, 1990, 1995-1996, 2001-2003, 2017-2018

ME Research Committee, 1991-1997

Ad-hoc committee on development of a joint PSU/OSU Ph.D. in Mechanical Engineering, Winter-Spring 1995

Supervisor of ME/CE computing Research Laboratory, 1990-1996

Supervisor of Thermal Management Laboratory, 1999 to 2007

Design and Supervision of Implementation of ME/CE Ethernet, 1989-1991

Evaluation Team for Administrative Computer System, September 1990

Professionally Related Service

Scholarly Reviews

Reviewer: ASEE Advances in Engineering Education, ASME Journal of Heat Transfer, ASME Journal of Fluids Engineering, International Journal of Engineering Education

NSF review panel for the Research Experiences for Undergraduates (REU) program, 2005-2007, 2009-2012

DOE proposals

Professional Societies

American Society for Engineering Education, Division of Experimentation and Laboratory Oriented Studies, Treasurer 2011, Technical Program Chair for Annual Conference 2012, Division Chair 2013, 2014

Invited Seminars

"Freshman Engineering Curriculum for Mechanical Engineers: Adapting 'Living with the Lab' to PSU", presented at the PSU Section of the IEEE Education Society, 19 September 2014, University of Portland.

"Overview of CFD and Parallel Computing", 23 July 1999, Intel TCAD Group, Hillsboro, Oregon.

"Thermal Modeling of Electronic Enclosures with PCBCAT", 10 January 1995, Oregon Section of the ASME

"Solution of the Heat Conduction Equation Using Additive Correction Multigrid on a Distributed Memory Parallel Computer", 30 November 1992, Battelle Pacific Northwest Laboratory, Richland, WA.

Memberships in Professional Societies

ASME, ASEE, IEEE, SIAM