

**MASSIMO "MAX" CAPOBIANCHI, Ph.D., P.E.**  
**Professor and Chair of Mechanical Engineering**

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**EDUCATIONAL BACKGROUND**

**May 1996 Ph.D. in Mechanical Engineering**

State University of New York (SUNY) at Stony Brook  
Stony Brook, New York  
(Specialization: thermal sciences)

**Thesis Title:** A New Experimental Technique for Measuring the Diffusion Coefficient in Binary Liquid Solutions.

**Advisor:**

Dr. Thomas F. Irvine, Jr., Late Professor Emeritus  
Department of Mechanical Engineering  
SUNY Stony Brook  
Stony Brook, New York

**Co-Advisor:**

Dr. Narinder K. Tutu  
Department of Advanced Technology  
Brookhaven National Laboratory  
Upton, New York

**May 1991 Master of Science in Mechanical Engineering**

SUNY Stony Brook  
Stony Brook, New York

**August 1988 Professional Engineering License**

The University of the State of New York  
License Number 064924

**May 1981 Bachelor of Engineering in Mechanical Engineering**

SUNY Stony Brook  
Stony Brook, New York

**PROFESSIONAL EXPERIENCE**

**September 1996 – Present**

**CURRENT TITLE: Professor and Chair**

**Gonzaga University**

**Department of Mechanical Engineering  
Spokane, Washington**

**Rank Appointments:** Professor, September 2005; Tenure, September 2003; Associate Professor, September 2000; Assistant Professor, September 1996.

**Department Chairman:** January 2016 – present, and June 2004 – December 2009.

**Responsibilities:** Teaching undergraduate lecture and laboratory courses, pursuing a research program for professional development, student advising, advising the Gonzaga University Student Chapter of the ASME (Sep. 1996 – May 2004), providing academic service to the university and to the community, and discharging all administrative duties for the department during tenure as chair.

Regular Teaching Assignments: Thermodynamics I and II; Fluid Mechanics; Heat Transfer; and Measurements and Instrumentation I and II (lecture).

Other Courses Taught: Computational Fluid Mechanics/Heat Transfer (also taught a graduate-level version of this course at the Università di Roma Tor Vergata in Rome, Italy, in the summer of 2003, as part

of their joint graduate program with the University of Illinois at Chicago); Advanced Heat Transfer; HVAC; Mechanical Design and Cooling of Electronic Systems; Thermal Science (survey course for non-mechanical engineering majors); Mechanical Engineering Design (i.e., Senior Design); and Measurements and Instrumentation I and II (lab).

Noteworthy administrative accomplishments: Led the department in developing a long-term vision that targeted excellence, and in planning, budgeting, and managing its implementation, with one outcome being the construction of a faculty research laboratory; guided the department through ABET accreditation, including writing its self-study; created a study-abroad curriculum for mechanical and civil engineering students that allows them to attend the Gonzaga-in-Florence program for one semester while still completing their degree in four years; wrote a successful proposal to the university's Academic Council for creating a new program in engineering management that includes concentrations in each of the engineering disciplines offered at the university; wrote successful facility proposals that constructed and equipped a new manufacturing processes (teaching) laboratory, and that expanded the school's machine shop and purchased capital equipment; managed and developed the mechanical engineering laboratory, including purchasing equipment, creating laboratory exercises, and developing its infrastructure; proposed and chaired a new school-wide committee that generated a standard assessment methodology for all of the engineering programs; chaired the university's Research Council; and served on the university's Rank and Tenure committee and on the analogous school-level committee.

**January 1996 – June 1996**

**September 1994 – June 1995**

**TITLE: Visiting Instructor**

**September 1995 – December 1995**

**TITLE: Adjunct Instructor**

**Responsibilities:** Teaching lecture and laboratory courses, and serving on committees. Regular courses taught: Diesel Engines (theory & lab), Engineering Measurements (theory & lab), Project Seminar (i.e., design project for last semester students), Introduction to Computer Programming, and Introduction to Computer Graphics (AUTOCAD). Other courses taught: Statics.

**SUNY College of Technology at Farmingdale**

**Automotive Engineering Technology Department**

**Farmingdale, New York**

**June 1995 – May 1996**

**June 1993 – September 1994**

**June 1992 – August 1992**

**TITLE: Guest Jr. Research Associate**

**Responsibilities:** Thesis research (see "Educational Background" section above for thesis title and for advisors' names and affiliations); designing and writing a general purpose data acquisition program using ASYST programming language to allow users to set-up KEITHLEY 500A data acquisition hardware without programming knowledge; composing a user's manual with detailed operational descriptions and instructions for the software package; supporting research activities as required.

**Brookhaven National Laboratory**

**Upton, New York**

**September 1991 – May 1993**

**TITLE: Graduate Teaching Assistant**

**Responsibilities:** Teaching recitation classes in Heat Transfer and Thermodynamics; grading exams, projects, and homework; consultations with students.

**SUNY Stony Brook**

**Department of Mechanical Engineering**

**Stony Brook, New York**

**August 1989 – August 1991**

**TITLE: Mechanical Engineer**

**Responsibilities:** Design of HVAC, sprinkler, and plumbing systems for commercial, residential, institutional, and industrial buildings in New York City and New York State; performing all necessary calculations, including cooling and heating loads, sizing air conditioning units, fans, pumps, piping, etc.;

**Capobianchi Engineers**

**Huntington Station, New York**

performing site inspections; filing and obtaining approvals from the building department having jurisdiction.

**August 1988 – August 1989**

**Microwave Power Devices, Inc.**

**TITLE: Mechanical Engineer**

**Hauppauge, New York**

**Responsibilities:** Electronic packaging of RF amplifiers for military and commercial applications; thermal, structural, and geometric analysis; supervising designers; supervising environmental testing; interfacing with customers; proposal writing; composing technical reports; providing manufacturing support.

**March 1987 – August 1988**

**Modern Fabrication & Technology, Inc.**

**TITLE: Project Engineer**

**Yaphank, New York**

**Responsibilities:** Developing software to permit graphical programming of NC machinery using AUTOCAD CAD software, including generating routines in AUTOLISP and composing a post-processor in BASIC to extract, optimize, and translate the CAD information into G-CODE NC language; training staff members in the use of AUTOCAD and the special programs; designing custom parts and mechanisms for customers and for in-house projects; customer interface and technical support; providing manufacturing support.

**January 1985 – March 1987**

**Airborne Instruments Laboratory Division**

**TITLE: Mechanical Engineer II**

**Eaton Corp.**

**Deer Park, New York**

**Responsibilities:** Electronic packaging of airborne tactical jamming equipment; designing mechanical devices to facilitate electrical adjustment of RF components; proposal writing; development of a computer program to perform automated geometric analysis of formed semi-rigid cables; supervising environmental testing; composing qualification by similarity reports and environmental test reports; providing manufacturing support.

**July 1983 – January 1985**

**Dorne & Margolin, Inc.**

**TITLE: Mechanical Engineer**

**Bohemia, New York**

**Responsibilities:** Electronic packaging of RF components and antennas for airborne applications; performing stress, dynamic, thermal, and tolerance analysis; composing test procedures, environmental test reports, and qualification by similarity reports; supervising environmental testing; generating process specifications required to assure proper control of critical manufacturing processes; providing manufacturing support.

**January 1982 – July 1983**

**Grumman Aerospace Corp.**

**TITLE: Assistant Structural Design Engineer**

**Bethpage, New York**

**Responsibilities:** Designing aircraft structural components using mainframe-based CAD software; performing tolerance analysis to assure fit of mating components; generating structural repair procedures; providing manufacturing support.

## **PUBLICATIONS**

### **Peer-Reviewed Journal Publications and Conference Proceedings:**

- M. Capobianchi and P. McGah, "Developing Region Solution for High Reynolds Number Laminar Flows of Pseudoplastic and Dilatant Fluids in Circular Ducts", Transactions of the ASME, Journal of Fluids Engineering, Vol. 139, Issue 4, April 2017, pp. 041202-1 – 041202-11.
- P. McGah and M. Capobianchi, "A Modification of Murray's Law for Shear-Thinning Rheology", Transactions of the ASME, Journal of Biomechanical Engineering, Vol. 137, May 2015, pp. 054503-1 – 054503-6.

- M. Capobianchi and A. Aziz, "Laminar Natural Convection Between a Vertical Surface with Uniform Heat Flux and Pseudoplastic and Dilatant Fluids", Transactions of the ASME, Journal of Heat Transfer, Vol. 136, September 2014, pp. 092501-1 – 092501-9.
- M. Capobianchi and A. Aziz, "Laminar Natural Convection From an Isothermal Vertical Surface to Pseudoplastic and Dilatant Fluids", Transactions of the ASME, Journal of Heat Transfer, Vol. 134, December 2012, pp. 122502-1 – 122502-9.
- M. Capobianchi and A. Aziz, "A Scale Analysis for Natural Convective Flows over Vertical Surfaces", International Journal of Thermal Sciences, Vol. 54, 2012, pp. 82-88.
- M. Capobianchi and D. Wagner, "Heat Transfer in Laminar Flows of Extended Modified Power Law Fluids in Rectangular Ducts", International Journal of Heat and Mass Transfer, Vol. 53, January 2010, pp. 558-563.
- M. Capobianchi, "Similitude Considerations in Internal Flows of Pseudoplastic and Dilatant Fluids: Pressure Drop and Heat Transfer in Parallel-plate Conduits", Proceedings of the 20th International Symposium on Transport Phenomena (ISTP-20), Victoria, British Columbia (Canada), July 7-10, 2009.
- M. Capobianchi, "Pressure Drop Predictions for Laminar Flows of Extended Modified Power Law Fluids in Rectangular Ducts", International Journal of Heat and Mass Transfer, Vol. 51, March 2008, pp. 1393-1401.
- M. Capobianchi, V. Labay, F. Shi, and G. Mizushima, "Simulating the Electrical Behavior of Integrated Circuit Devices in the Presence of Thermal Interactions", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, Vol. 25, No. 10, October 2006, pp. 2231-2241.
- M. Capobianchi, J. Voight, and S. Surapaneni, "Modeling Electro-Thermal Behavior of Integrated Circuit Devices", Advances in Electronic Packaging - 1999, Volume 1, EEP-Vol. 26-1, D. Agonafer, M. Saka, and Y.-C. Lee, Editors, ASME, New York, 1999, pp. 915-922, presented at the Pacific Rim / ASME International Intersociety Electronic and Photonic Packaging Conference (InterPACK 99), Lahaina, Maui, Hawai'i, June 13-19, 1999.
- M. Capobianchi, T.F. Irvine, Jr., N.K. Tutu, and G.A. Greene, "A New Technique for Measuring the Fickian Diffusion Coefficient in Binary Liquid Solutions", Experimental Thermal and Fluid Science, Vol. 18, 1998, pp. 33-47.
- M. Capobianchi, A New Experimental Technique for Measuring the Diffusion Coefficient in Binary Liquid Solutions, Ph.D. Thesis, Department of Mechanical Engineering, SUNY Stony Brook, Stony Brook, New York, May 1996.
- L.S. Wang and M. Capobianchi, "Irreducibility of Irreversibility by Unrestrained Quasistatic Changes in a Thermodynamic System", Thermodynamics and the Design, Analysis, and Improvement of Energy Systems, AES Vol. 30 (HTD Vol. 266), H.J. Richter, Editor, ASME, New York, 1993, pp. 115-125, presented at the ASME Winter Annual Meeting, November 28 – December 3, 1993, New Orleans, Louisiana.
- S. Park, T.F. Irvine Jr., and M. Capobianchi, "Experimental and Numerical Study of Friction Factor for a Modified Power Law Fluid in a Rectangular Duct", Proceedings of the Third World Conference on Experimental Heat Transfer, Fluid Mechanics, and Thermodynamics, Honolulu, Hawai'i, October 31 – November 5, 1993, Vol. 1, Elsevier Science Publishers B.V., New York, 1993, pp. 900-908.
- M. Capobianchi and T.F. Irvine Jr., "Predictions of Pressure Drop and Heat Transfer in Concentric Annular Ducts with Modified Power Law Fluids", Wärme-und Stoffübertragung (Heat and Mass Transfer), Vol. 27, No. 4, 1992, pp. 209-215.

### Chapters in Textbooks and Handbooks:

- T.F. Irvine Jr. and M. Capobianchi, "Non-Newtonian Flow" and "Non-Newtonian Fluids-Heat Transfer", The CRC Handbook of Mechanical Engineering, 1<sup>st</sup> and 2<sup>nd</sup> Editions, F. Kreith, Editor, CRC Press, Inc., Boca Raton, Florida, 1998 (1<sup>st</sup> Edition) and 2005 (2<sup>nd</sup> Edition).

The "Non-Newtonian Flow" chapter also appears in the following handbooks:

- Fluid Mechanics, Frank Kreith, Editor, CRC Press LLC, Boca Raton, Florida, 2000.
- The Handbook of Fluid Dynamics, Richard W. Johnson, Editor, CRC Press LLC, Boca Raton, Florida, 1998.

Both the "Non-Newtonian Flow" and the "Non-Newtonian Fluids-Heat Transfer" chapters also appear in The CRC Handbook of Thermal Engineering, F. Kreith, Editor, CRC Press, Inc., Boca Raton, Florida, 1999.

- T.F. Irvine Jr. and M. Capobianchi, "Triangular Ducts, Flow and Heat Transfer", International Encyclopedia of Heat and Mass Transfer, G.F. Hewitt, G.L. Shires, and Y.V. Polezhaev, Editors, CRC Press LLC, Boca Raton, Florida, 1997.

#### **Editorships:**

- Update Editor (one revision), The Mechanical Engineering Handbook CRCnetBASE, which is the CD ROM version of The CRC Handbook of Mechanical Engineering (F. Kreith, Editor-in-Chief), CRC Press, Inc., Boca Raton, Florida, 2001 (since superseded by 2<sup>nd</sup> Edition of The CRC Handbook of Mechanical Engineering).

#### **Invited Lectures at Conferences and Workshops:**

- "Simulating the Electrical Behavior of Integrated Circuit Devices in the Presence of Thermal Interactions", presented at the First ASME-ATI (Associazione Termotecnica Italiana) Joint Workshop on Thermal and Fluid Dynamics, Villa Mondragone, Frascati, Italy, June 30, 2003.
- "Measuring the Fickian Diffusion Coefficient in Binary Liquid Solutions Using the Decaying Pulse Technique", presented at the Thomas F. Irvine Jr. Symposium in Thermal and Fluid Sciences, SUNY Stony Brook, Stony Brook, New York, November 17, 2001.
- "Modeling the Electrical Behavior of Integrated Circuit Devices in the Presence of Thermal Interactions Using Saber", presented at the 2000 Analogy Saber Simulator Users Resource (ASSURE) Conference, Portland, Oregon, May 10-12, 2000.
- "Modeling the Electrical Behavior of Integrated Circuit Devices in the Presence of Thermal Interactions", presented at the Bi-Weekly Seminar Series of the Washington State University (WSU) Center for Advanced Multiphase Materials Processing (CAMMP), WSU College of Engineering and Architecture, Pullman, Washington, March 10, 2000.
- "Modeling Electro-thermal Behavior of Integrated Circuit Devices", presented at the 1999 Analogy Saber Simulator Users Resource (ASSURE) Conference, Fort Worth, Texas, May 19-21, 1999.
- "Modeling Thermal and the Electro-Thermal Behavior of Power Integrated Circuits", presented at the 1998 ASSURE Conference, Mt. Hood, Oregon, March 18-20, 1998.

#### **Invited Lectures to Industry:**

Invited lectures to industry on my research on electro-thermal co-simulation of integrated circuit devices:

- Synopsys, Inc. (previously Analogy, Inc.), Hillsboro, Oregon, September 12, 2005, and June 3, 2004; Analogy Inc., Beaverton, Oregon, July 29, 1999, and July 23, 1998.
- The Boeing Company, Phantom Works Group, Kent Washington, October 1, 2001; Electronic Systems and Missile Defense Space and Communications Group, December 6, 1999, October 21, 1998, and April 13, 1998.
- The Crane/Interpoint Corporation, Redmond, Washington, December 6, 1999; Crane/Eldec Corporation, Lynwood, Washington, April 13, 1998.
- Texas Instruments Inc., Dallas, Texas, August 2, 1999, May 29, 1998, and November 17, 1997.

#### **Other Presentations:**

Presented six status reports on my research on electro-thermal co-simulation of integrated circuit devices to the industrial advisory board of the National Science Foundation Center for the Design of Analog-Digital Integrated Circuits (NSF CDADIC), July 1997 through February 2000 (NSF CDADIC is an industry-university research consortium sponsored by the NSF Industry-University Cooperative Research Center program).

## GRANTS AND MONETARY AWARDS

- \$300,000 award from the PACCAR Foundation to build a new laboratory for teaching manufacturing processes and systems, and to expand the existing machine shop. April 2002.
- \$100,000 award from The Boeing Company to purchase new machine shop capital equipment. April 2002.
- \$225,000 award from the M. J. Murdock Charitable Trust to purchase equipment for the new manufacturing processes and systems laboratory. March 2002.
- One-year, \$20,000 award from NSF CDADIC to develop a software model for electro-thermal co-simulation of integrated circuit devices packaged in multi-chip modules. July 1999.
- Two-year, \$50,000 award (i.e., \$25,000 per year) from NSF CDADIC to develop a methodology for modeling the electro-thermal behavior of integrated circuit devices. September 1997.
- Various small grants for supporting undergraduate student research assistants: McDonald Work Awards (institutional), \$18,665; and The Boeing Corporation, \$1,200. June 2000 onward.

## SERVICE TO THE PROFESSION

### Invited Reviews of Works of Other Professionals:

- Fluids (one paper), May 2016.
- Zeitschrift für Naturforschung A (one paper), August 2015.
- Computer Methods in Applied Mechanics and Engineering (one paper), January 2014.
- Heat and Mass Transfer (one paper), August 2011.
- Meccanica (Springer Netherlands) (one paper), March 2010.
- Nonlinear Analysis: Modeling and Control (Lithuanian Association of Nonlinear Analysts) (one paper), November 2008.
- Wärme-und Stoffübertragung (Heat and Mass Transfer) (one paper), January 2007.
- Oxford University Press (one chapter of a new thermodynamics textbook), December 2005.
- 2004 ASEE Annual Conference (two papers), February 2004.
- International Journal of Thermophysics (one paper), January 2003.
- IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (two papers), June 2001 and August 2000.

### Other Professional Service:

- Served on the scientific committee for the ASME-ATI-UIT 2015 Conference on Thermal Energy Systems: Production, Storage, Utilization and the Environment, that was held in Naples, Italy, in May 2015. The conference was organized under the auspices of the American Society of Mechanical Engineers (ASME), the Associazione Termotecnica Italiana (ATI), and the Unione Italiana di Termofluidodinamica (UIT), and was co-sponsored by The International Centre for Heat and Mass Transfer (ICHMT).
- Department of Defense (DoD): Served on the Mechanical Engineering Review Panel for the DoD National Defense Science and Engineering Graduate Fellowship Program from 1998 through 2010, chairing the panel from 2000 through 2010.
- National Aeronautics and Space Administration (NASA): Served as a review panelist for the NASA Aeronautics Scholarship Program in 2009 and 2010.
- American Society of Mechanical Engineers: Served as Region VIII Senior Representative to the Student Sections Committee from 2001 through 2004, and as Region VIII Representative to the Mechanical Engineering Department Heads Executive Committee from 2004 through 2006.

## **AWARDS AND RECOGNITIONS**

- Awarded the 2002 ASME Student Section Advisor Award, a national-level award recognizing my work as the Gonzaga student section faculty advisor, at the ASME International Congress and Exposition, New Orleans, Louisiana, November 2002. I was also the ASME Region VIII nominee for the same award the prior year.

## **PROFESSIONAL AFFILIATIONS**

- Member, Council on Undergraduate Research.
- Member, American Society of Mechanical Engineers.
- Professional Member, American Society for Engineering Education.