Dr. John Bandler's Historical Note

Research in the Simulation Optimization Systems (SOS) Research Laboratory paved the way to the world's first statistical modeling/yield-driven design technology used within major CAD/CAE products. International research and industrial collaborations, including Optimization Systems Associates Inc. (OSA), founded by Dr. John W. Bandler, has been vital. Click here for publications. Click here for SOS reports. Click here for G-SOC reports for the years 1973-1983.

We collaborated in the creation of OSA's RoMPE™, HarPE™ and OSA90/hope™, featuring the world's most powerful harmonic balance optimizer, as well as in Empipe™, Empipe3D™, EmpipeExpress™, ***empath***™ and the breakthrough Space Mapping and Geometry Capture technologies. The Empipe family became the foundation of Agilent HFSS Designer and Momentum Optimization (Agilent Technologies, now Keysight Technologies). See details of OSA's products for 1997, just before acquisition by Hewlett-Packard.

The world's most advanced family of L_1, L_2, Huber and minimax optimizers have been implemented in a friendly CAD environment. Pioneering software development for CAE, including design centering, optimal assignment of tolerances, postproduction tuning and production yield enhancement continues. We have worked on efficient techniques for large-scale optimization, active device parameter extraction, physics-based statistical device modeling and simulation, design centering and yield-driven design for GaAs microwave/millimeter-wave monolithic integrated circuits.

We have integrated optimization software with microwave measurement technology, full-wave electromagnetic (EM) simulators, and SPICE-like simulators.

Since 1993, we have focused on Space Mapping technology. This led to the development of the user-friendly Matlab-based system called SMF.

Our historical association with OSA and Bandler Corporation resulted in state-of-the-art commercial CAE software being available to us from many groups, most notably Sonnet Software, Inc., Ansoft Corporation (now ANSYS), Agilent Technologies (now Keysight Technologies), CST Computer Simulation Technology, and Faustus Scientific Corporation.

Funding

Funding has included grants from the Natural Sciences and Engineering Research Council of Canada (NSERC). Over the years our research has been supported by Com Dev International, Research in Motion (RIM, makers of the BlackBerry), the Communications Research Centre Canada, Nortel Networks, and the Micronet Network of Centres of Excellence.

Collaborators

Major recent collaborators include J.E. Rayas-Sánchez, Q.S. Cheng, Slawomir Koziel, N.K. Nikolova, and Q.J. Zhang of Carleton University, founder and developer of the NeuroModeler System. Major long-term collaborators include Kaj Madsen. See also under People.

Short Term Goal

To advance the state of the art in modeling of engineering devices and optimal design of complex engineering systems through Space Mapping Technology.

Newsworthy Items

Dr. Bandler's achievements and commercial software implementations include design centering and yield-driven design, for which he received the 2004 Microwave Application Award from the IEEE Microwave Theory and Techniques Society. He was awarded IEEE Canada's 2012 McNaughton Gold Medal "For pioneering contributions to optimization technology and microwave CAD." In the same year he was honored by a Queen Elizabeth II Diamond Jubilee Medal: "John is an engineer, a professor, an innovator, a researcher, a writer of technical papers, and a writer of fiction and non-fiction. He has published over 470 technical papers, founded companies; he is world renowned for work in microwave theory and techniques."

His rump session on "Human Aspects of Communication and Persuasion: First Impressions and Subtext," at the IEEE International Microwave Symposium, Montreal, June 19, 2012 is available on IEEE.tv. At the same conference, the Focus Session on "Retrospective and Outlook of Microwave CAD" paid tribute to him on the occasion of his 70th birthday for more than forty-five years of pioneering contributions.

Honoring his 75th birthday, N.K. Nikolova, J.E. Rayas-Sánchez and Q.J. Zhang organized the Special Session "The State-of-the-Art Technologies for Modeling, Optimization and Tuning of Microwave Circuits" for the IEEE MTT-S International Microwave Symposium, Honolulu, HI. In 2022, coinciding with his 80th birthday, J.E. Rayas-Sánchez and Q.J. Zhang organized the Special Session "A Retrospective and a Vision of Future Trends in RF and Microwave Design Optimization" for Denver, CO.

The IEEE Microwave Theory and Techniques Society honored Dr. Bandler with its 2013 Microwave Career Award "For a career of leadership, meritorious achievement, creativity and outstanding technical contributions in the field of microwave theory and techniques." He has also received McMaster University's Faculty of Engineering Research Achievement Award.

His April 11, 2013 seminar at McMaster University on "From Creativity to Success via Risk and Setback: An Insider's Perspective" is available on McMasterUTV. His 2014 TEDx talk "Explain Less, Predict More" is available through TEDx McMaster U.

Dr. Bandler reviews the history of space mapping in J.W. Bandler, "Have you ever wondered about the engineer's mysterious 'feel' for a problem?" IEEE Canadian Review, no. 70, pp. 50-60, Summer 2013.

In 2016, Dr. Bandler was appointed Officer of the Order of Canada "For his scientific contributions that have helped to position Canada at the forefront of microwave engineering."

In 2018, Dr. Bandler was honored by McMaster University with its 2018 Lifetime Innovator Award and by Professional Engineers Ontario with their premier award, The Gold Medal. See the video that introduced Dr. Bandler at the OPEA Gala on November 17, 2018.

Drs. Bandler and Rayas-Sánchez review the history of optimization technology for automated design of microwave circuits in J.W. Bandler and J.E. Rayas-Sánchez, "An early history of optimization technology for automated design of microwave circuits," (invited), IEEE J. Microwaves, vol. 3, no. 1, pp. 319-337, Jan. 2023.

In 2023, Dr. Bandler receives the IEEE Electromagnetics Award "For contributions to electromagnetic optimization and the modeling of high-frequency structures, circuits, and

devices."

Sketches of recent technical, non-technical and artistic initiatives, with hyperlinks, can be found at the Bandler Corporation website. See also Dr. Bandler's Google Scholar Citations, Wikipedia, his YouTube channel and his listing in the Department of Electrical and Computer Engineering, McMaster University.

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