

Paul de la Houssaye, Ph.D.

Education

California Institute of Technology — Applied Physics, B.S., June 1980

Stanford University — Applied Physics, M.S., June 1982

Stanford University — Applied Physics, Ph.D., September 1988

CNRS Laboratoire de Microstructures et de Microélectronique, Paris, France

Postdoctoral Research, Resonant Tunneling Devices & X-Ray Mask Fabrication, November 1988-November 1989

Appointments

Scientist, Naval Information Warfare Center Pacific (NIWC Pacific) — 36 years of service

Technical leadership, research, program development, technology transition, and scientific coordination in microelectronics, photonics, artificial intelligence, mathematical algorithms, MEMS, nanotechnology, superconductivity, bio-computing, medical devices, and related fields.

Technical Expert, COR/GTR, and Program Advisor — 1996–Present

Supported DARPA, ONR, and ONDCP and other government programs through program definition, contracting, technical review, proposal evaluation, grant and contract management, and technology transition.

Technical Reviewer, Panel Member, and Program Coordinator — More than six years assisting at the Center for Commercialization of Advanced Technologies and Office of Technology and Commercialization.

Science and Technology Advisory Committee Member — Two years

Reviewed NIWC internal research proposals.

Publications and Patents

22 patents, 53 publications in the open literature, including 29 refereed publications and invited papers, and two book chapters

Representative research contributions (copies at <https://scholar.google.com/citations?user=6jxX6k4AAAAJ&hl=en>)

P. R. de la Houssaye, J. Mauger, A. R. Bulsara, C. Hutchens and B. Migliori, "Noise Driven Coupled Nonlinear Systems: A "Dynamical Multilayer Perceptron" Demonstrating XOR Functionality," *IEEE Access*, **11**, pp. 144306-144324, 2023.

Paul R. de la Houssaye. "Microelectromechanical Gas Concentrator". Patent US 6,517,610. February 11, 2003

M. Wetzel, L. Shi, K. Jenkins, P.R. de la Houssaye, Y. Taur, P.M. Asbeck, I. Lagnado. "A 26.5 GHz Silicon MOSFET 2:1 Dynamic Frequency Divider," *IEEE Microwave and Guided Wave Letters*, 10(10), pp. 421-423, Oct. 2000.

R.A. Johnson, P.R. de la Houssaye, M.E. Wood, G.A. Garcia, C.E. Chang, P.M. Asbeck, I. Lagnado. "Silicon-on-Sapphire MOSFET Transmit / Receive Switch for L and S Band Transceiver Applications," *Electronics Letters*, 33(15), pg. 1324-1326, 17 July 1997.

Paul R. de la Houssaye. "Structure for providing high resolution modulation of voltage potential in the vicinity of a surface". Patent US 5,274,255. December 28, 1993.

P.R. de la Houssaye, M.J. Burns, W.S. Ruby, S.D. Russell, L.P. Lee, G.A. Garcia, S.R. Clayton. "Demonstration of Monolithic Co-fabrication of $Y_1Ba_2Cu_3O_{7-d}$ and CMOS Device Fabrication on the Same Sapphire Substrate," presented at the 51st Device Research Conference, Santa Barbara, CA, June 21-23, 1993. Abstract published in *IEEE Transactions on Electron Devices*, 40(11), 2139-2140, Nov. 1993.

C. Khan Malek, B. Kebabi, A. Charai, P.R. de la Houssaye. "Effect of thermal treatment on the mechanical and structural properties of gold thin films," Proceedings 35th International Symposium on Electron, Ion, and Photon Beams, *Journal of Vacuum Science and Technology B*, **9**(6), 3329-3332, Nov./Dec. 1991.

P.R. de la Houssaye, Claude M. Pechina, Charles A. Hewett, Robert G. Wilson, James, R. Zeidler. "Electrical Activation of Boron Implanted into Diamond," *Proceedings of the Second International Conference on the New Diamond Science and Technology (ICNDST-2)*, Sept. 23-27, Washington, D.C., 1990.

P. R. de la Houssaye, D. R. Allee, Y.-C. Pao, D. G. Schlom, J. S. Harris, Jr. and R. F. W. Pease. "Electron Saturation Velocity Variation in InGaAs and GaAs Channel MODFET's for Gate Lengths to 550 Å," *IEEE Electron Device Letters*, **9**(3), pp. 148-150, March 1988.

D. R. Allee, P. R. de la Houssaye, D. G. Schlom, J. S. Harris, Jr., R. F. W. Pease. "Sub-100nm Gate Length GaAs MESFET's and MODFET's Fabricated by a Combination of Molecular Beam Epitaxy and Electron Beam Lithography," *Proceedings 31st International Symposium on Electron, Ion, and Photon Beams, Journal of Vacuum Science and Technology B*, **6**(1), pp. 328-332, Jan./Feb. 1988.

Funding/R&D Leadership—Responsible for up to \$200 M in programs

Noise-Based Computation for Artificial Intelligence—Initiator/team lead

Internal Research funded. Work received a NIWC Paper of the Year Award.

ONR 100-nm Silicon-on-Sapphire — Supervised and directed a substantial portion of the project

ONR Funded project over an eight-year period.

DARPA Young Faculty Award Program — Lead of the NIWC–DARPA interaction.

Structured and managed approximately 30 seedling grants per year for six years.

SSC Open Broad Agency Announcements supporting DARPA MTO — Managed program for NIWC for six years.

Reviewed more than 100 proposals annually.

Government Technical Representative Overseeing Dozens of Other Programs over past 30 years—Recents include

- Innovative Vacuum Electronics Science and Technology (INVEST) Program, DARPA
- Three Dimensional Monolithic System-on-a-Chip (3DSoc) Program, DARPA
- Gamma Ray Inspection Technology Program (GRIT), DARPA
- Effective Quantitative Antenna Limits for Performance (EQuAL-P), IARPA
- Predictive Nanoscale Simulation for the Terahertz Regime (NanoSim), DARPA
- Optimum Processing Technology Inside Memory Arrays (OPTIMA), DARPA

Served as a frequent technical reviewer and panel member for technology commercialization programs

UCSD Connect, Center for Commercialization of Advanced Technology (CCAT), Office of Technology Transfer and Commercialization (OTTC)).

IEEE Leadership Activities:

2018-2022 Chair, San Diego Chapter of the IEEE Photonics Chapter.

2025 Chair, San Diego Chapter of the IEEE Broadcast Society.:

NIWC Ph.D. Hiring—Proposed, led, and completely revamped program, conceptualizing and establishing new procedures and organizational structures for Ph.D. recruitment that increased the quantity and quality of Ph.D. hires

Held position of PMW 170 Science and Technology Coordinator/ONR Integrated Topside Program Liaison (1 year)

Synergistic Activities

SOS Research (this effort and the following have resulted in a nomination for IEEE Fellow Grade Status)

Creative and technical leadership on early work on silicon-on-sapphire (SOS) devices at GHz frequencies, all while training graduate students from UCSD in the process, produced results that surpassed contemporary silicon-based technology, including devices with $f_{\max}$ up to 66 GHz, noise figures below 1 dB at 2 GHz, 2.4-GHz low-noise amplifiers, and highly isolated L- and S-band transmit/receive switches. These results became the technological foundation for Peregrine Semiconductor's highly successful product line. Peregrine's SOS technology ultimately enabled chips providing the exceptionally high isolation required by FCC standards between cable and antenna inputs in virtually all televisions, as well as radiation hard devices used in present day satellites.

Diamond Device Research

Performed back in 1990 the first measurement of successful boron doping in diamond, leading to the first demonstration of a field-effect transistor in diamond. This was the beginning of an effort that has just recently culminated in unprecedented performance limits for high-power electronics.

Taught Device Physics Class at San Diego State University (1999)

Elected Member Uptown Planners and Community Planning Corporation, Community Planning Group (Service to the Community of San Diego) 1992-2004 (Approximately 12 years)

Mentoring

For Inspiration and Recognition of Science and Technology (FIRST®)

2014-2017 Coach and Organizer for First® Lego® League Robotics Team at Dana Middle School

2017-2026 Coach/Mentor & Organizer for Point Loma High/Corriea Middle School First® Tech Challenge Team

Co-advising/Mentoring Students

1993-1998 Mentored 3 UCSD Graduate Students

Miscellaneous

- Plays violin and speaks limited French and German, and some Polish.