

Glenn S. Solomon

Fellow, Joint Quantum Institute

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Beginning \approx July 2021:

The Hicks Professor of Quantum Materials

Department of Physics, University of Adelaide, Adelaide, AU

[Google Scholar link](#)

Approximately 240 publications (excluding conference abstracts but including 16 patents).

Education:

Ph.D. Materials Science, 1997, Stanford University, Stanford, CA.

Advisor: James Harris Thesis: Fabrication and characterization of InAs quantum dot structures.

M.S.E. Electrical Engineering, 1995, Stanford University, Stanford, CA.

M.S.E. Materials Science and Mechanical Engineering, 1983, Duke University.

Thesis: Electrically driven flow in a needle plate electrode geometry.

B.S.E. Materials Science & Mechanical Engineering, 1980, Duke University, Durham, NC.

Areas of Interest:

Semiconductor-based quantum optics.

Cavity QED with discrete quantum dot states and microcavities

Optical processes and control in single quantum dots

Crystal growth, fabrication and testing of compound semiconductor-based optical devices

Current position:

Hicks Professor of Quantum Materials, *Department of Physics, University of Adelaide*. (Beginning July 2021)

Adjunct Professor Physics & JQI Fellow; *Joint Quantum Institute & University of Maryland. Physicist; Physical Measurements Laboratory, National Institute of Standards and Technologies. Associate Editor; Applied Physics Reviews*. Responsible for the area of quantum science and technology.

Awards and Fellowships:

IBM Faculty Partnership Award (2001), acknowledging the productive research partnership with my research at Stanford University and IBM on semiconductor spintronics materials.

Fellow, American Physical Society (2007), “for recognizing extensive contributions to the study of quantum optics with quantum dots.”

U. S. Department of Commerce Bronze Metal (2012), “for the development of quantum materials at NIST using molecular-beam epitaxy.”

Fulbright Scholar Fellowship (2015). A US State Department Fellowship to promote international dialogue, in my case spent at the University of Innsbruck, Austria.

Fellow, Optical Society (OSA) (2018), “for pioneering the development of semiconductor quantum dot optical materials and device structures for solid-state quantum optics”

Professional experience:

Adjunct Professor Physics and JQI Fellow (2006-Present). University of Maryland & Joint Quantum Institute. Adjunct Professor of Physics at the University of Maryland, and a founding Fellow at The Joint Quantum Institute (JQI). The institutes focus is the broad study of quantum phenomenon such as coherence and superposition.

Physicist, Physical Measurements Laboratory, National Institute of Standards and Technologies, (2006-Present). Semiconductor nanostructure-based quantum optics. Leveraging crystal growth and processing of nanostructures we investigate and manipulate confined states in nanostructures. We are

interested in the coupling of these systems to cavities and waveguides for fundamental and technological interests.

President and CEO, CBL Technologies, Inc., Redwood City, CA (1/97-present). • Founder and President of a start-up company to develop flexible hybrid GaN vapor-phase epitaxial growth techniques. Development areas include self-assembled GaN nanowires, semi-insulating GaN, thick buffer lattice-matched buffer layers, and free standing substrates. • Responsibilities include management, marketing, technical licensing and technology development. This company receives funding through the United States Governments SBIR program, as well as from the private sector.

CTO Sunvolt Nanosystems, Inc., (2005-2020) Chief Technology Officer, Sunvolt Nanosystems Inc. Developed solar-cell technology and ultra-fast, high-growth rate epitaxial equipment and design.

Fulbright Scholar (2015-2016) Under a fellowship from the Fulbright foundation, a visiting professor in the Physics department at the University of Innsbruck, Austria. Developed and a graduate-level semiconductor quantum optics class, and conducted a master-level seminar; and assisted with the graduate program in Prof. Dr. Gregor Weihs.

Associate Professor-Consulting, (2005-2014) Department of Electrical Engineering, Stanford University. Collaborations between my NIST/JQI-based research efforts and those at Stanford University, focusing on molecular-beam epitaxy growth and characterization of ordering quantum dots (QDs) in microcavities, lasing in single QD systems.

Visiting Scholar, Paul Drude Institut, Berlin, Germany (9/2003 – 12/2004). Investigating quantum nanostructures in the GaN material system, and electronic spin relaxation processes in InGaAs nanostructures.

Senior Research Associate/Acting Assistant Professor, Department of Electrical Engineering, Stanford University, Stanford, CA (1999 – 2005). • Teaching: Advanced Optoelectronic Devices, Department of Electrical Engineering. • Initiated a program for the spatial ordering of InAs quantum dots in select regions of nanostructures. • In conjunction with IBM-Almaden, studied spin-based devices and processes in semiconductor, and metal-semiconductor structures. • Investigated cavity-quantum electrodynamics in the weak coupling regime using isolated quantum dots confined in three-dimensional microcavities. • Investigated InAs quantum dots focusing on fundamental crystal growth, ordering phenomenon, single quantum dot isolation schemes, and optical characterization. • Directed a research group of 25 graduate and postdoctoral students from Material Sciences, Applied Physics and Electrical Engineering during the sabbatical period of a professor. Duties include directing the research of graduate students, managing contracts, directing laboratory operations and interacting with funding agencies.

Research Associate, Ginzton Laboratory, Stanford University, Stanford, CA (2/96-12/98) • Development of semiconductor quantum dot program for single quantum-dot light emission. This work combines crystal growth, processing and optical spectroscopy to investigate the spontaneous emission properties from isolated quantum dots. • Assist students in research related to nanostructures through project design and experimental execution.

Research Assistant, Stanford University, Stanford, CA (6/90-2/96) Ph.D. Student • Investigated the fabrication of InAs quantum dots in GaAs by a lithography-free, MBE growth process. Characterization was made with AFM and low temperature PL. Device fabrication was made using vertically aligned columns of electronically coupled quantum dots in a broad-band LED. • Developed a model explaining the effects of monolayer coverage, growth temperature and In/As flux ratio of the InAs quantum dot size and array density. • Studied thin heteroepitaxial interlayers of Si in III-V semiconductor structures, and the effects of Si planar doping on the DX center.

Research Engineer, Research Triangle Institute, Research Triangle Park, NC (6/84-9/89) • Managed a subcontract with the Stanford Linear Accelerator Center (SLAC) for the development of chalcopyrite materials for use as spin polarized NEA emitters. • Designed and constructed a dual reactor MOVPE system for the growth of III-V and II-IV-V₂ chalcopyrite epitaxial structures. • Conducted MOVPE growth and characterization of epitaxial ZnGeAs₂ and ZnGe_xSi_{1-x}As₂ on GaAs. • Designed a vertical impingement, multi-wafer OMVPE growth chamber.

Research Assistant, Duke University, Durham, NC (9/81-9/83) Masters Student • Studied the secondary gas flow developed from the ionization of gases near the high voltage tip in a needle-

plate electrode geometry. This flow system models the secondary gas flows developed in electrostatic precipitators with point defects in the conducting wires.