

CLARA ASMAIL

SUMMARY OF QUALIFICATIONS

Energetic and creative leader with strong program/project management skills and broad experience in early-stage technology development and commercialization. Bring analytic and confident mindset from Physics training and experience to administrative challenges. Develop and deploy train-the-trainer programs for complex public-private extension network. Managed \$10M/year SBIR Program. Negotiated and implemented 100+ collaborative extramural agreements with varied intellectual property terms. Enjoy direct interactions with customers. Exceptional organizational skills and ability to form coalitions internally and externally. Received: US Dept. of Commerce Bronze Medal, NIST George Uriano Award, and SBA Tibbetts Award.

EDUCATION

1988 - MS - Optical Sciences, University of Arizona, Tucson, AZ
1986 - MS - Physics, Tulane University, New Orleans, LA
1984 - BS - Physics, Fordham University, NY, NY

PROFESSIONAL EXPERIENCE

2016 to present **Senior Program Analyst, Office of Technology Transitions, Department of Energy**

Advise on policies affecting data management and aspects of technology transfer programs at the laboratories. Represents the organization at major symposia and professional meetings, international conferences, workshops, and other highly visible activities on data management related aspects of technology transfer.

Develop, develop and maintain IT products or tools which will deliver functionality and enable OTT to build a positive brand, create customer-oriented linkages to the labs/programs and to external links that enhance automated data collection, cataloging of technology transfer practices and outcomes, data reporting and documentation.

2010 to 2016 **Senior Technical Advisor, Manufacturing Extension Partnership (MEP), NIST**

Senior Technical Advisor and Program Manager for Technology Acceleration Strategic Initiatives: Lead the research and development of new approaches for deployment throughout the complex MEP network to support small R&D and manufacturing companies with services and access to resources to commercialize technologies. Build partnerships with university and federal laboratory technology managers and other early-stage technology owners, business incubators and accelerators, and third party service providers with two objectives: fortify innovation ecosystems with manufacturing-related services, and connect manufacturers with technology-based growth opportunities. Develop and pilot train-the-trainer programs to support MEP Center staff in building new commercialization assistance service delivery competencies. Execute complex project plans working with a diverse team comprised of MEP staff, contractors, MEP Center staff, other federal agency staff, industry leaders, and trade association staff. Liaison to MEP Advisory Board Committee on Technology Acceleration and lead author on Background Report and Implementation Plan for MEP Technology Acceleration.

Team Leader for Additive Manufacturing (AM) Initiative: Lead initiatives to support MEP Centers in their work with traditional small and medium sized manufacturers to increase

awareness and consideration of additive manufacturing methods. Programs launched include connecting leaders in AM technology fields with MEP network to build awareness and develop business models for AM within US manufacturing. Led the development of a taxonomy schema to capture and characterize the varied purposes and pathways for introducing additive manufacturing to the product development lifecycle; and populate the schema with 15 (so far) examples of MEP projects involving AM to create a compendium of case studies.

Team Co-Lead for Access to Capital Initiative: Develop informational materials, identify resources, and foster national/regional partnerships to facilitate MEP Center engagements with manufacturers involving financial needs for growth initiatives. Building coalitions of early adopters to expand acknowledgement of business case for MEP Centers to facilitate funding discussions to supplement growth projects.

2006 to 2010 **Technology Marketing Program Manager, Technology Partnerships Office, NIST**

Responsible for marketing all NIST Laboratory technologies. Identified commercially viable intellectual property, IP and formed portfolios by technology and industry sectors, resulting in more than 25 patent licenses. Developed from concept a pilot implementation of the SBIR Program focused on transferring federal IP to small businesses. My “SBIR TT” concept resulted in 50+ contracts providing funds, access to NIST IP and other assets to small businesses to advance NIST technologies toward commercialization. Mentored other leaders who recognized my SBIR TT model as innovative through its implementation at the NIH, NASA and Department of Energy.

Cooperated with MIT Enterprise Forum and Maryland’s Technology Development Corp (TEDCO), Virginia’s CIT, CO Labs, and First Responder communities and arranged all intramural aspects to organize NIST’s technology showcases directed to private investors and companies interesting in partnering opportunities on microfluidic, green, first responder technologies and nanotechnologies. Dozens of research collaborations resulted from those showcases. Collaborated with Office of General Counsel and Chiefs of Laboratories to educate NIST staff regarding their role in a new IP policy – this resulted in a doubling in the rate of inventions disclosed over a two year period. Designed and implemented a technology web portal with RSS feed to market NIST technologies.

2001 to 2010 **Program Manager, Small Business Innovation Research Program (SBIR), NIST**

Oversaw transfer of management of NIST SBIR Program from National Oceanic and Atmospheric Administration (NOAA) and institutionalized all new administrative functions at NIST. Forged multi-organization teams across NIST to manage and oversee implementation of the entire program from solicitation to proposal review to award and program review. Defined research subtopic areas with input from NIST Laboratories. Developed solicitations in accordance with requirements that evolved from 2001 reauthorization, Executive Orders and Small Business Administration (SBA) Policy Directive. Provided guidance to firms and to NIST researchers. Managed the evaluation and selection process, ensured appropriate funding agreements were awarded, and the management of all projects. Conducted diligence on legacy SBIR contracts held at NOAA for NIST and de-obligated and managed the return of \$5M to NIST from NOAA. Raised \$2.2M from other federal agencies to fund highly meritorious projects that were beyond NIST SBIR budget capacity. Proposed and received \$7M American Reinvestment and Recovery Act (ARRA) funds for SBIR awards and was first in Department of Commerce to execute ARRA-funded contracts, with reporting requirements satisfied.

2008
and
2009

Detail to Technology Innovation Program (TIP)

Provided technical assistance in review of proposals. Actively contributed as Team Member in development of Energy White Paper.

1997 to
2002

CRADA and Licensing Officer, Office of Technology Partnerships, NIST

Responsible for implementation of Cooperative Research and Development Agreements (CRADAs), and market assessment and licensing of NIST inventions.

Executed CRADAs (40+, excluding consortia) by negotiating and drafting terms for IP, and the confidentiality of proprietary and collaboration R&D information. Provided guidance to NIST researchers on NIST policies regarding the purpose of CRADAs. Identified and managed IP issues within context of CRADA and informal collaborations.

Facilitated agreement between companies and NIST to create four formalized consortia with arrangements for IP and structure designed to maintain industrial integrity of participants' contributions with regard to proprietary information, fairness and collaborative R&D, and NIST involvement.

Performed commercial assessments for intramural invention disclosures. Provided recommendations to Laboratory management staff regarding optimum technology transfer mechanism consistent with NIST mission and policies within derived commercial assessment. Provided technical guidance on patent prosecution. Managed the portfolio of patents by performing triage, identifying potential licensees and marketing the technologies. Negotiated license terms and implemented exclusive and non-exclusive license agreements.

Identified and resolved issues regarding IP and proprietary information in guest researcher agreements, non-disclosure agreements and facility use agreements.

Cooperated extensively with the Office of General Counsel on legal issues pertinent to terms of agreements executed.

1988 to
1997

Physicist and Principal Investigator, Optical Technology Division, NIST

Project Management: Defined scope and developed from ground up the Bidirectional Scattering Metrology Project. Independently sought funding sources for project to construct a class 10 clean room, design and fabricate a custom goniometric optical scatter instrument, and fund salaries. Sponsors included: NIST Office of Microelectronic Programs (\$190K/yr for 5 years); SEMATECH (\$200K); NIST's ATP (\$175K over 2 years); Secretary of the Air Force/Office of Research (\$1.4M); CCG (\$1.5M over 5 years); Ballistic Missile Defense (\$175K); and DOE Oak Ridge Optics MODIL (\$190K).

Service to Industry: Actively participated in a SEMATECH Task Force on Microroughness and Particulate Contamination of Silicon Wafers. Co-authored critical metrology methodology for cross-calibration of silicon wafer inspection systems and developed technique to optimize detection of contamination of surfaces in presence of microroughness. Contributed extensively in the development of an ASTM Test Practice for Bidirectional Reflectance Distribution Function (BRDF) metrology. Appointed as project leader for ASTM BRDF standard document revision and ISO BRDF standard document development. Assisted in organizing an intercomparison of BRDF

measurements across 18 US facilities. Chaired conferences: Miniaturized Systems with Microoptics and Micromechanics (1994 and 1995) and Optical Scattering in the Semiconductor, Data Storage and Optics Industries (1995), Scattering and Surface Roughness (1997, 1998, and 1999). Team member in national effort to resolve metrological problems faced by microlithography community at 193 nm. Initiated and led cooperative effort between BRDF project at NIST and a parallel program at the Universitat der Bundeswehr in Hamburg, Germany.

Research and Development Activities: Designed a state-of-the-art instrument for measuring the bidirectional optical scatter distribution from surfaces. Designed and contracted the fabrication of a class 10 clean room. Designed, fabricated, and aligned multi-axis, ultra-rigid mechanical goniometer system and laser source. Performed error budget for the laser source system, mechanical positioners and detection system. Conducted research on bidirectional scattering measurement methodology to investigate the low-level limit for BRDF metrology and correction factors due to practical geometrical considerations. Investigated potential SRM materials for BRDF calibration and developed and evaluated a prototype set for production. Collaborated with other organizations within NIST, as appropriate, in surface roughness and contamination research as related to optical scattering properties. Developed technique for distinguishing optical scatter due to silicon wafers microughness from that induced by superficial and buried contaminants. Developed scheme for intercomparing integrated scatter measurements using different geometry instruments.

Published 20+ papers and co-inventor on patent to discriminate scattering from particulates on microrough surface. That patent license earns historical highest royalty revenue to NIST.

1990 to
1997

Instructor, Physics Department Montgomery College

Taught Introductory Physics I and II, and Numerical Methods classes.

1986 to
1988

Research Assistant, Optical Sciences Center, University of Arizona

Assisted in the infrared laboratory research involving BRDF and materials characterization. Designed optical layout and implemented introduction of HeCd laser (3.39um) to BRDF laboratory. Conducted research on Christenssen filters.

1984 to
1986

Teaching Assistant, Physics Department, Tulane University

Taught Introductory Physics classes, labs and recitations each semester including the summers. Conducted research on colorimetry and modeling of the diffraction of iridescent fowl feathers. Assisted in design of instrumentation for dynamic and static optical scatter measurements of macromolecules under magnetic field.

1982 to
1983

Laboratory Assistant, Physics Department, Fordham University

Categorized and organized various defunct laboratories, especially the Optics Lab. Assisted in preparing geology lab equipment for students.

1979 to
1984

Credit Clerk, Henri Bendel, NYC

Responsible for new credit history background checks and daily charge limits for retailer.

PUBLICATIONS

1. C. Asmail and J. Michaelson, "Collaboration: Turbo-Charging the Economic Engine," *Industry Today* [5,3](#), (2012).
2. C. Asmail, "Use of Small Business Innovation (SBIR) Program in Support of Technology Transfer," *les Nouvelles*, vol. XLV, No. 3, pp 135-139, Sept 2010.
3. T. Germer and C. Asmail, Microroughness-blind Hemispherical Optical Scatter Instrument, US Patent # [6,034,776](#). Licensed Exclusively to ADE and then novated to KLA-Tencor in 2000 to present.
4. T. Germer and C. Asmail, "Goniometric optical scatter instrument for out-of-plane ellipsometry measurements," *Rev. Sci. Instrum.* **70**, [3688-3695](#) (1999).
5. T. Germer and C. Asmail, "Polarization of light scattered by microrough surfaces and subsurface defects," *J. Opt. Soc. Am. A*, **16**, [1326-1332](#), June 1999.
6. T. A. Germer, and C. C. Asmail, "Bidirectional ellipsometry and its application to the characterization of surfaces," in *Polarization: Measurement, Analysis, and Remote Sensing*, D. H. Goldstein and R. A. Chipman, Editors, *Proc. SPIE* **3121**, 173-182, (1997).
7. T. A. Germer, and C. C. Asmail, "A goniometric optical scatter instrument for bidirectional reflectance distribution function measurements with out -of-plane and polarimetry capabilities," in *Scattering and Surface Roughness*, Z.H. Gu and A. A. Maradudin, Editors, *Proc. SPIE* **3141**, 220-231, (1997)
8. T. A. Germer, C. C. Asmail, and B. W. Scheer, "Polarization of out-of-plane scattering from microrough silicon," *Optics Letters*. **22**, 1284-1286 (1997).
9. T. A., Germer and Asmail, "Bidirectional ellipsometry and its application to the characterization of surfaces," in *Polarization: Measurement, Analysis, and Remote Sensing*, D.H. Goldstein and R.A. Chipman, Editors, *Proc. SPIE* **3121**, 173-182 (1997).
10. T. Germer and C. Asmail, "Proposed methodology for characterization of microroughness-induced optical scatter instrumentation," in *Flatness, Roughness, and Discrete Defect Characterization for Computer Disks, Wafers, and Flat Panel Displays*, ed. J. C. Stover, *SPIE Proc.* **2862**, 12-17, (1996).
11. T. Germer and C. Asmail, "Spatial Frequency Response Function Estimation Program" and related documentation available upon [request](#).
12. E. L. Church, P. Z. Takacs, C. C. Asmail and R. E. Parks. The statistical and scattering properties of surfaces generated by the plateau polishing model, NIST Internal Report (1995).
13. C. Asmail, C. Cromer, J. Proctor, J. Hsia, "Instrumentation at the National Institute of Standards and Technology for bidirectional reflectance distribution function measurements," *SPIE Proc.* **2260**, 52 (1994).
14. C. Asmail, J. Hsia, A. Parr, and J. Hoefl, "Rayleigh scattering limits for low-level BRDF measurements," *Applied Optics* **33**, 25 (1994).
15. R. Parks, C. Evans, C. Asmail, "Research uses of black glass," *Proceedings OSA*

Science of Finishing Topical Meeting (1994).

16. C. Asmail, J. Fuller, and R. Parks, "Status of bidirectional reflectance distribution function (BRDF) Calibration Standards Development," SPIE Proc. **1993**, 44 (1993).
17. J. Hsia and C. Asmail, "BRDF measurement methodology," NIST Report (1993).
18. C. Asmail, "Bidirectional scattering distribution function (BSDF): a systematized bibliography," J. Res. Natl. Inst. Stand. & Technol. 96 (2) (1991).
19. C. Asmail, "Cleanliness requirements for the air in a BRDF facility," SPIE Proc. **1165**, 360 (1989).
20. C. Asmail and J. Hsia, "Reconciliation of surface scatter data obtained with solar simulators and lasers," SPIE Proc. **1165**, 151 (1989).
21. C. Asmail, "Cleanliness requirements for the air in a BRDF facility," SPIE Proc. **1165**, 360 (1989).
22. C. Asmail and J. Hsia, "Reconciliation of surface scatter data obtained with solar simulators and lasers," SPIE Proc. **1165**, 151 (1989).
23. C. Asmail, "Static and dynamic light scattering from ferromagnetic macromolecules," Masters Thesis, Tulane University, 1986.

SAMPLE OF PRESENTATIONS

1. Presented: "[How Ideas out of the Lab have helped US Industry Grow](#)" to regional manufacturing groups.
2. Frequently presented MEP commercialization programs to audiences including: Federal Laboratory Consortium (FLC), Association of University Technology Managers (AUTM), Licensing Executives Society (LES), Interagency Working Group on Technology Transfer (IAWGTT), National Science Foundation Industry/University Collaboration Research Centers ([I/UCRC](#)), National Council on Entrepreneurial Technology Transfer ([NCET2](#)), BASF Scouting Workshop, and regional manufacturing conferences (Montana, Wisconsin, Kansas City, NY).
3. Presented NIST SBIR and SBIR TT Program objectives and processes to a variety of audiences including National Academy of Sciences (2008); SBIR National Conferences (annually); NSF Nanotechnology Conference (2005); frequently at FLC, AUTM, LES conferences; and the International Society for Professional Innovation Managers ([ISPIM](#)) in Bilbao, Spain (2010).
4. Presented best technology transfer practices at plenary and panel sessions at Federal Laboratory Consortium (FLC), Association of University Technology Managers (AUTM), Licensing Executives Society (LES), and other conferences 2000 to present.
5. Hosted prospective industrial consortia members and presented CRADA provisions relevant to formation of consortia. These consortia include: Optical Properties of Materials, Brachytherapy, Single Crystal Silicon, Smart Cards.
6. "Bidirectional ellipsometry and its application to the characterization of surfaces" and

“Goniometric optical scatter instrument for bidirectional reflectance distribution function measurements with out-of-plane and polarimetry capabilities,” Universitat der Bundeswehr, Hamburg, Germany, February 1997.

7. "Instrumentation at the National Institute of Standards and Technology for bidirectional reflectance distribution function measurements," SPIE 2260, July 1994.
8. "Scattering Predictions Based on Polishing Plateau Model," SPIE 2260, July 1994.
9. "Status of bidirectional reflectance distribution function (BRDF) calibration standards development," SPIE Conference 1993, July 1993.
10. "Bidirectional Scattering Metrology," Greenbelt, MD, May 19-20, 1992, Council for Optical Radiation Measurement Annual Meeting.
11. "NIST BRDF Program," 1991 MODIL Scatter Workshop, Bozeman, Montana, September 23-24, 1991.
12. "Reconciliation of surface scatter data obtained with solar simulators and lasers," SPIE Conference 1165, July 1989.
13. "Cleanliness requirements for the air in a BRDF facility," SPIE Conference 1165, July 1989.
14. "BRDF Program Integration," ORNL, Oak Ridge, TN, April 1989
15. Many technical project reviews and proposals to varied R&D sponsors.

PROFESSIONAL DEVELOPMENT

- ◆ Coach to new NIST leaders in NIST New Leader Development Program (2015)
- ◆ Served on NIST Awards and Medals Review Committee (2011-2013).
- ◆ Detailed to NIST Technology Innovation Program (TIP) (8-9/08 and 6-7/09)
- ◆ Member of prestigious NIST New Leader Program Cohort V (2007)
- ◆ Federal Laboratory Consortium (FLC) Laboratory Representative for NIST Boulder campus, and Alternate Member of the Board of Directors, FLC (2006)
- ◆ Served as Member of NIST Diversity Advisory Board, representing TS (2004 – 2006)
- ◆ Member of Board of Examiners for Maryland Performance Excellence Award – served as examiner for Silver Medal recipient (2005)
- ◆ Active member of: SPIE, OSA, ASTM, CORM, and ISO (1988 – 1997). Chair in ASTM and ISO committees (1995-1998) for BRDF-related efforts.
- ◆ Team Lead in SEMATECH Definitions Committee and Task Force on Microroughness on Silicon Wafers and (1993-97).

- ◆ Coached team of Middle School students to win First Place in Regional DoE Science Bowl and then compete at the National level winning 3rd Place in the Fuel Cell Car competition and 5th Place in the Academic competition.

AWARDS

1997 U.S. Department of Commerce Bronze Medal
2010 NIST George A. Uriano Award
2012 Small Business Administration Tibbetts Award