

J A S O N R. H A A H E I M

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Summary of Qualifications

- Multi-talented scientist with liberal arts background possessing versatile problem solving skills; R&D innovations have lead to numerous published patents; instrumentation/software troubleshooting acumen serves as a vital departmental asset.
- Managerial and leadership abilities displayed through NanoInk applications group management, NSTI Nanotech program committee chairmanship, and officer positions in undergraduate organizations. Impressive organizational abilities and meticulous attention to detail help direct activities to get the job done.
- Applications engineer experience rooted in sales support via outstanding product demonstrations, comprehensive customer training, market-focused product development, and crafting successful marketing strategies.
- A polished and dynamic public face for an organization, leveraging wide-ranging performance experience to deliver seamless presentations. Public speaking talents demonstrated nationally and internationally at seminars and conferences.
- Deep technical expertise in Atomic Force Microscopy (AFM) and Dip Pen Nanolithography (DPN); broad knowledge of surface patterning methods, scanning probe lithographies, Micro Electrical Mechanical Systems (MEMS), surface chemistry, microfluidics, microfabrication techniques, Molecular Beam Epitaxy, III-N electronics and optoelectronics.
- Excellent writing skills supported by technical writing training, and demonstrated through numerous publications.
- Consummate interpersonal skills; easy going and quick to establish a comfortable and productive rapport with colleagues.
- Professional experience demonstrates distinct value to a company through the breadth of responsibilities handled with distinction and efficacy, all while providing creative solutions to complex problems (e.g., planar leveling methods for 2D array technology that enabled a new business division in a multi-billion dollar industry).

Professional Experience

NanoInk, Inc.; Skokie, IL

Senior R&D Engineer *supervisor*, Dr. Terry Renner (Director of Applied Sciences) January 2009 – present

- Implemented 2D array project leader experience to develop production protocols for NanoStem Cell division cell culture studies.

Manager, DPN Applications *supervisor*, Tom Levesque (VP DPN Sales) January 2008 – December 2008

- Retained status as technical resource of reference on nearly all issues regarding Nanofabrication Systems Division instrumentation and applications. Applied expertise to launch of new instrumentation line (DPN 5000).
- Managed DPN Applications group to advance commercialization objectives; group included one full-time Ph.D. scientist, two Ph.D. interns, and one B.S. intern.
- Launched www.dpnforum.com as a pivotal resource for the Dip Pen Nanolithography international community; site served as a natural outgrowth of training workshops and DPN community networking. Co-designed the site – including customer resource pages and phpBB discussion boards – and served as site moderator and admin. Exceeded the best expectations for traffic, membership, and unique site hits (over 50,000 per month).
- Capitalized on prominent role in the DPN community to assume program committee chairmanship for NSTI Nanotech 2009. Promoted the National Nanotechnology Initiative (NNI) via a public policy tour congressional showcase; met with representative Dan Lipinski (D-IL), and the chief science policy aides for senator John Kerry (D-MA) and then-senator Barack Obama (D-IL).
- Facilitated technical collaborations between NanoInk and Northwestern University (Mirkin group), University of Strathclyde (Graham group), Forschungszentrum Karlsruhe (Fuchs group), and Avanti Polar Lipids (Alabaster, AL; Dr. Walter Shaw, CEO).
- Authored an Applied Physics Letters peer-reviewed publication, and feature articles for American Laboratory and Microscopy Today. Contributed conference talks included SPIE MOEMS-MEMS (2009), NSTI Nanotech (2008), and SPIE Defense and Security (2008).

Senior Applications Engineer *supervisor*, Tom Levesque (Director DPN Sales) January 2006 – December 2007

- Lead product development on multiple R&D projects including MEMS and electronic devices (Active Pen™ thermal bimorph cantilever arrays), mechanical and optical designs, thin film research, instrument software, and microfluidics. Project leader for the 2D nano PrintArray™ of 55,000 nanoscopic tips; subsequent recipient of the Illinois Engineering Council 2007 Engineering Achievement Award; primary architect of three corresponding patents. Array development enabled launch of a new NanoInk division – NanoStem Cell – dedicated to controlling adult mesenchymal stem cell differentiation (multi-billion dollar market).
- Contributed to instrumentation design, thoroughly characterized product portfolio, and matched these capabilities to customer needs. Guided software development via market feedback and testing. Troubleshot advanced hardware and software issues in the field, and provided critical customer support.
- Product development focus supported by market analysis: actively contributed to Scientific Advisory Board meetings, and drove applications development discussions to transform disparate opinions on DPN applicability into a concrete list of commercialization opportunities. Served as a key technical resource for Intellectual Property committee planning and decision-making.
- Developed curricula and conducted international DPN training workshops. Training success supported by my recognized ability to teach and explain difficult concepts; coworkers and students have called it a “gift for making the complex understandable.” Evolved as a focal networker and technical nexus point in the international DPN community; orchestrated NanoInk’s sponsorship of a highly-attended special DPN symposium at NSTI Nanotech 2008.

Senior Applications Engineer, NanoInk (continued)

- Developed quality control protocols for MEMS consumables inventory; implemented QC protocols via in-house SEM inspection, optical microscopy, and electrical continuity testing. Performed microfabrication work at the University of Illinois-Chicago NCF cleanroom facility. Oversaw purchase, setup, training, maintenance, and administration of in-house thermal evaporation system.
- Generated marketing collateral and website content for the launch of a revamped www.nanoink.net. Authored an invited review article for the Scanning journal special issue. Primary author for the Wikipedia entry on Dip Pen Nanolithography. Contributed conference talks included NSTI Nanotech (2007), SPIE Defense and Security (2007), Harvard School of Chemistry Nanotechnology Colloquium (2006), and NSTI Nanotech (2006).

Applications Engineer *supervisor*, Dr. Ray Eby (VP Product Development) July 2003 – December 2005

- Performed Dip Pen Nanolithography instrumentation demos smoothly and effectively to support sales team. Rapidly assimilated DPN technology knowledge – instrumentation, hardware, software, chemistry – and began giving product demonstrations within three weeks of joining the company. Supervisor commented: “You’re brilliant with customers.” Became equally comfortable conversing about core technology with everyone from university professors to venture capital investors.
- Contributed novel DPN probe and inkwell designs to product development; innovations became standard and implemented across entire customer base.
- Assisted Intellectual Property team in evaluating emerging technologies and establishing NanoInk ownership for protection of valuable patents.
- Acted as technical liaison to the sales team via potential customers, and through trade shows and conferences. Authored a peer-reviewed publication (Ultramicroscopy) and contributed a conference talk (Nanomaterials, 2004). Gave national and international seminars, and produced demonstration and instructional videos. Customers and colleagues worldwide asked if I had experience as a professional actor, noting my poise on film and my comfort in front of crowds.

Education

M.S., Electrical Engineering *advisor*, Dr. Umesh K. Mishra August 2001 – June 2003
University of California, Santa Barbara Cumulative G.P.A.: 3.88

Grew high quality III-V semiconductor thin films (GaN, AlN) via Molecular Beam Epitaxy for use in Ultra Violet LED structures at one of the premier MBE facilities in the country (Dr. Art Gossard, director); performed rigorous inspection of these films via Atomic Force Microscopy.

B.A., Physics and Honors Music September 1997 – May 2001
Gustavus Adolphus College – St. Peter, MN Cumulative G.P.A.: 3.74

graduated *magna cum laude* and **Phi Beta Kappa**

Honors / Organizations

- National Science and Technology Institute (NSTI) NanoTech NanoFab **program committee chair** 2008 – present
- NSTI NanoTech technical review committee member 2007 – 2008
- University of Illinois, Urbana-Champaign, Nano-CEMMS Symposium **invited speaker** 2008
- Professional society memberships: Institute of Electrical and Electronics Engineers (IEEE) [since 2003]; Materials Research Society (MRS) [since 2006]; American Physical Society (APS), American Chemical Society (ACS), and International Society for Optical Engineering (SPIE) [since 2007] 2003 – present
- Illinois Engineering Council Engineering Achievement Award 2007
- Practical Product Management certification; attended Pragmatic Marketing seminar 2006
- Recipient of **two NSF** Graduate Research Fellowship **Honorable Mentions** 2001 – 2003
- University of California, Santa Barbara - Dean’s Fellowship 2001 - 2003
- **President** of the Gustavus Band, **Vice President** of the Gustavus Orchestra 2000 – 2001
- Gustavus Adolphus College **Deans List**, **President’s Honor List** (G.P.A. > 3.7), **Partners Scholarship for research**, **Norelius Community Service Award**, and John Chindvall Scholarship in Physics (2000 – 2001) 1997 – 2001
- Presented two papers at the National Conference on Undergraduate Research (NCUR) 2001
- National Merit Commended Scholar; Tenth place nationally in the Drake Physics Exam 1997
- Member of Chaska High School State Champion Knowledge Bowl and Quiz Bowl teams 1994 – 1997

Additional Skills

- Proficiency with characterization techniques such as Scanning Electron Microscopy (SEM) and X-Ray Diffraction (XRD), in addition to electronics characterization tools – probe stations, oscilloscopes, digital multimeters, lasers and optics – thermal evaporators, optical microscopy, and vacuum systems.
- Expert knowledge of MS Office programs (Word, Excel, PowerPoint, Outlook) and EndNote, with proficient knowledge of customer resource management software (Microsoft CRM), Enterprise Resource Planning (Microsoft DAX), JMP, MatLab, Mathematica, PSI plot, Sigma Plot, Origin, Adobe Acrobat / Photoshop / Illustrator, and video editing software packages (MovieMaker, Final Cut).
- Fluent with website creation, maintenance, hosting, and design. (Co-designed and administered www.dpnforum.com.)
- Member of the Civic Orchestra of Chicago’s MusiCorps outreach and education program (2004 – 2008).
- Accomplished orchestral timpanist and percussionist; drummer for the indie-jazz quartet The J3 Intent; cited as “outstanding musician” by the International Jazz Educator’s Association.
- Rock climbing, alpine backpacking, mountain biking, sky diving, and cross country and downhill skiing.

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Selected Publications

- Haaheim, J.; Nafday, O.; "Dip Pen Nanolithography: A 'Desktop Nanofab' Approach Using High-Throughput Flexible Nanopatterning." *Microscopy Today*, March 2009.
- Haaheim, J.; Nafday, O.; Levesque, T.; Fragala, J.; Shile, R.; "MEMS-Enabled Dip Pen Nanolithography[®] for Directed Nanoscale Deposition and High-Throughput Nanofabrication." *Proceedings of SPIE MOEMS-MEMS*, 2009.
- Haaheim, J.; Nafday, O.; "Desktop Biological Nanopatterning Using Dip Pen Nanolithography." *American Laboratory*, 40 (20), 2008.
- Wang, H-T.; Nafday, O.; Haaheim, J.; Tevaarwerk, E.; Amro, N.; Sanedrin, R.; Chang, C-Y.; Ren, F.; Pearton, S.; "Toward Conductive Traces: Dip Pen Nanolithography[®] of Silver Nanoparticle-Based Inks." *Applied Physics Letters* **93**, 143105 (2008).
- Stokes, R.; Dougan, J.; Irvine, E.; Haaheim, J.; Stiles, P.; Levesque, T.; Graham, D.; "Fabrication of biosensor arrays via DPN and detection by surface enhanced resonance Raman scattering." *Proceedings of SPIE Nanoscience and Engineering: Plasmonics: Metallic Nanostructures and their Optical Properties VI*, 7032-W320, 2008.
- Haaheim, J.; Nafday, O.; "Dip Pen Nanolithography: A 'Desktop Nanofab' Approach Using High-Throughput Flexible Nanopatterning." *Scanning* Vol. 30, 137-150 (2008) [**invited review article; 6th most downloaded in 2008**].
- Haaheim, J.; Tevaarwerk, E.; Fragala, J.; Shile, R.; "Commercially Available High-Throughput Dip Pen Nanolithography[®]." *Proceedings of SPIE Defense and Security: Micro (MEMS) and Nanotechnologies 6959-19590*, 2008.
- Nafday, O.; Vaughn, M.; Haaheim, J.; Weeks, B.; "Modeling Nanoscale Ink Transport in Dip Pen Nanolithography[™]." *Proceedings of SPIE Defense and Security: Micro (MEMS) and Nanotechnologies 6959-B9591*, 2008.
- Fragala, J.; Shile, R.; Haaheim, J.; "Enabling the Desktop Nanofab with DPN[®] Pen and Ink Delivery Systems." *Proceedings of MRS Fall 2007 Symposium: Microelectromechanical Systems - Materials and Devices 1052313-319*, 2008.
- Haaheim, J.; Tevaarwerk, E.; Fragala, J.; Shile, R.; "Dip Pen Nanolithography[®]: A Maturing Technology for High-Throughput Flexible Nanopatterning." *Proceedings of SPIE Defense and Security: Micro (MEMS) and Nanotechnologies 6556-T5560*, 2007.
- Amro, N.; Haaheim, J.; "The Dip Pen Nanolithography[™] (DPN[®]) Process for High Resolution Nanofabrication." *Physik Journal* 2006.
- Nafday, O.; Rajasekar, P.; Haaheim, J.; Weeks, B.L. "Patterning High Explosives at the Nanoscale." *Propellants, Explosives, Pyrotechnics* 31, No. 5 (2006).
- Nafday, O.; Weeks, B.L.; Haaheim, J.; Eby, R. "Patterning PETN and HMX using Dip Pen Nanolithography[™]." *Proceedings of MRS Fall 2006 Symposium: Multifunctional Energetic Materials 896251-256*, 2006.
- Haaheim, J.; Eby, R.; Nelson, M.; Fragala, J.; Rosner, B.; Zhang, H.; Athas, G. "Dip Pen Nanolithography[™] (DPN[™]): Process and Instrument Performance with NanoInk's NSCRIPTOR System." *Ultramicroscopy* 2005, 103 (2): 117-132.

Patents

- U.S. Patent 2008-0055344: "Fast Dip for Reduced Wicking in Nanolithographic Ink Delivery"
- U.S. Patent 2008-0055598: "Using Optical Deflection of Cantilevers for Alignment"
- U.S. Patent 2008-0309688: "Nanolithography with use of Viewports"
- U.S. Patent 61/026,196: "Cantilever Array Leveling"
- U.S. Patent 12/251,415: "Lithography of Nanoparticle Based Inks"
- U.S. Patent 11/268,740: "Active Pen Nanolithography: Methods to manufacture enhanced actuated probes for dip pen nanolithography and products therefore or produced thereby."

REFERENCES AVAILABLE UPON REQUEST

FULL PUBLICATION AND CONFERENCE PRESENTATION LIST AVAILABLE UPON REQUEST