

Chris K. Haas, PhD

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Plastics and Security Materials Expertise

Technical Consulting, IP Support, Expert Witness

Collaborative, team-focused engineer who uses customer-articulated insights to create novel, manufacturable solutions with project lead experiences ranging from early idea generation to launched products. Deeply knowledgeable expert of polymers, plastics, and patents who is also an enthusiastic and approachable educator with focus on development of products and team members. Specialist in security document materials and features.

Areas of Expertise:

- **Project & Team Management**
- **New Product & Technology Development**
- **Polymer Extrusion & Coating**
- **Security Document Printing and Fabrication**
- **Intellectual Property Generation & Maintenance**
- **Business Development**
- **Polymer & Adhesive Systems & Properties**
- **Security Features**

Professional Experience

INDIGO SCIENCES, LLC, Saint Paul, MN

Corporate Scientist/Consultant

2020 - Present

Provides technical and business support for polymer systems, plastics processing, and security materials, including materials selection, physical testing and analysis, troubleshooting, and short courses. Also consults on intellectual property generation and defense, including claim crafting and patent and infringement analysis and provides expert witness services (depositions, expert reports, etc.) in product liability and patent infringement cases.

GEMALTO (Acquired by THALES), Oakdale, MN

Corporate Scientist, Physical Document Security R&D and Components Business

2017 - 2020

Performed several product support and development roles (quality, manuf., and R&D) for component solutions, including films, labels, and laminates. Business development manager for \$10M security labels business.

- Developed and launched 3 new-to-the-world security label products as sole development / manufacturing engineer with over \$1M in new product sales using novel adhesive and film systems.
- Saved over \$2M by establishing new manufacturing and supply chain for labels and laminates business while increasing product profitability 40%.
- Designed and set up new 4K sq. ft. laboratory facility, including establishing all lab protocols.
- Managed all acquired materials IP, including licensing aspects, office actions, and strategy. Filed 4 patents, 1 issued by December 2020. Licenses will generate \$1M in revenue starting in 2021.

3M, Maplewood, MN

Senior Product Development Specialist, Traffic Safety / Safety Security Division (SSD)

2004 - 2017

Led multiple top new product development projects through several different development phases, managing diverse international teams and 6 direct reports. Managed capital, lab, and manufacturing expenditure budgets.

- Engaged with dozens of external customers and stakeholders to elicit articulated and unarticulated needs and guided solutions as team lead by working with business and manufacturing organization to develop over 10 novel film and security products, resulting in more than \$250M new product sales.
- Led more than 10 different teams with US and non-US personnel with marketing, manufacturing, and lab backgrounds with project phases ranging from early ideas to completed launched products.
- Invented and developed laserable nanoparticle/polycarbonate film and micro-optic laserable and color floating image technologies involving hands-on development, leading to over \$30M in annual new product sales.
- Developed several products using novel or modified hot melt or pressure-sensitive adhesive systems.
- Worked with corporate labs and external agencies, incorporating their technologies into products.
- Served as sole technical member of SSD's IP management committee, administering division's patent portfolio, including deciding which ideas to patent; 17 issued patents.

Prior role at 3M:**3M Corporate Research Process Laboratory, Senior Process Development Engineer**

Led platform on polymer foaming, adhesives, blending, biodegradables, and supercritical fluid processing. Supported several divisional programs with accumulated product sales of over \$500M.

Academic Professional Experience

UNIVERSITY OF SAINT THOMAS (UST), Saint Paul, MN

2009 - Present

Engineering Fellow, Mechanical Engineering Department

- Crafted and teaches courses in Materials Engineering, Fluid Mechanics Lab, Polymers in Design, and Thin Films.
- Guided over 30 year-long engineering projects in Senior Design with local medical device, manufacturing, start-up, and innovative design companies as project mentor and consultant.
- Active member of Engineering school which has grown from 24 to over 150 graduating seniors since 2009.

Education and Professional Development

- **Doctor of Philosophy (PhD)**, Chemical Engineering, Northwestern University, Evanston, IL 1997
 - Thesis Advisor: Prof. John Torkelson
 - Dissertation: "Coarsening in 2D and 3D Phase-Separated Polymer Solutions: Implications for Microporous Membrane Morphology"
- **Bachelor of Science (BS)**, Chemical Engineering, Northwestern University, Evanston, IL 1993
- **3M Programs:**
 - Six Sigma Green Belt
 - Advanced Leadership Development Program

Academic Outreach

- University of St. Thomas Core Curriculum Committee, 2018 - Present
- Co-Leader of Northwestern University (NU) Resource Team at 3M, 2003 - 2017
 - PhD recruiter, building team of over 12 PhDs
 - Brought \$1M into NU from 3M in research projects, fellowships, capital funding, and grants
- UST intern recruiter for materials-based engineering juniors at 3M, 2013 - 2017
- 3M liaison to Canadian National Research Council, 2001 - 2003
- Obtained 3M non-tenured faculty funding to professors at 4 universities, 1999 - 2013

Industry Involvement and Leadership Positions

- American Institute of Chemical Engineers (AIChE), Member
- NU Chemical and Biological Engineering Advisory Board, 2009 – Present
- Document Security Alliance Program Committee member, 2020 – Present
- Document Security Alliance Security Features Working Group member, 2017 – 2020
- Optical Document Security Conference Organizing Committee, 2014 – 2019
- 3M Tech Forum Intellectual Property and Printing Chapter Steering Committees, 2010 – 2017
- AAMVA Mobile Driver's License Working Group, 2015 – 2017

18 Patents Issued and 2 articles published in Refereed Journals (see Addendum)

Addendum

18 patents issued (main designations only)

- US 6468451, Method of Making a Fibrillated Article; Inventors: Perez, MA and Haas, CK; Oct 2002
- US 6645618, Aliphatic Polyester Microfibers, Microfibrillated Articles and Use Thereof; Inventors: Hobbs, TR, Soo, PP, Perez, MA, Haas, CK, and Kody, RS; Nov 2003
- US 6646019, Fibrillated Foam Article; Inventors: Perez, MA and Haas, CK; Nov 2003
- US 6692823, Microfibrillated Articles Comprising Hydrophilic Component; Inventors: Kody, RS, Perez, MA, Klun, TP, Graham, PD, Haas, CK, et al.; Feb 2004
- US 6890649, Aliphatic Polyester Microfibers, Microfibrillated Articles and Use Thereof; Inventors: Hobbs, TR, Soo, PP, Perez, MA, Haas, CK, and Kody, RS; May 2005
- US 7094463, Foam and Method of Making; Inventors: Haas, CK, Gehlsen, MD, Mortenson, SB, Strobel, JM, Sura, RK, and Vall, DL; Aug 2006
- US 7655296, Ink-Receptive Foam Article; Inventors: Haas, CK, Taylor, RD, Black, WB, Jonza, JM, and Coopriders, TE; Feb 2010
- EP 1513690, Ink-Receptive Foam Article; Inventors: Haas, CK, Taylor, RD, Black, WB, Jonza, JM, and Coopriders, TE; Mar 2010
- US 7820282, Foam Security Substrate; Inventors: Haas, CK, Taylor, RD, Black, WB, Jonza, JM, Jennen, JM, Vall, DL, and Stumo, RJ; Oct 2010
- US 7883769, Integrally Foamed Microstructured Article; Inventors: Seth, J, Haas, CK, Sura, RK, Graham, KAS, Venne, JA; Feb 2008
- US 8003176, Ink Receptive Article; Inventors: Ylitalo, CM, Bacon, CA, Haas, CK, Jonza, JM, and Pellerite, J; Aug 2011
- US 8012550, Ink Receptive Article; Ylitalo, CM, Boyd, SA, Carls, JC, Carlson, EH, Haas, CK, Jonza, JM, Pellerite, J, and Watkins, RF; Aug 2011
- US 8496340, Retroreflective Articles and Retroreflective Elements Comprising a Spherical Core and Two Concentric Optical Interference Layers; Inventors: Budd, KD, Frey, MH, Haas, CK, and Krishnan, V; Jul 2013
- JP 5330407, Retroreflective Pavement Marking; Inventors: Budd, KD, Frey, MH, Haas, CK, and Krishnan, V; Oct 2013
- US 9289962, Laser-Personalized Security Articles; Inventors: Chen-Ho, K, Haas, CK, Dunn, DS, et al.; Mar 2016
- US 9340059, Static Dissipating Laser Engravable Film; Inventors: Haas, CK, Jaeger, PF, Lamanna, WM, Marszalek, GJ, and Garringer, K; May 2016
- US 10017001, Laser-Personalized Security Articles; Inventors: Chen-Ho, K, Haas, CK, Dunn, DS, Kong, SHC, Olson, DB, Larson, RA, and Potts, TL; Jul 2018
- US 10406845, Flexible Hinge Material Comprising Cross-Linked Polyurethane Material; Inventors: Rhyner, SJ, Haas, CK, Jones, TD, Chen-Ho, K, Hunt, KK, and Marx, RE; Sept 2019

Articles Published in Refereed Journals

1. C.K. Haas and J.M. Torkelson, Phys. Rev. E. **55**, 3191 (1997)
2. C.K. Haas and J.M. Torkelson, Phys. Rev. Lett. **75**, 3134 (1995)
3. T.G. Shepard, C. Haas and R. Menon, Proceedings of ASME 2017 Fluids Engineering Division Summer Meeting (2017), FEDSM2017-69211