Nancy A. Falk, Ph.D.

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Summary

- Independent technical consultant in cleaning and disinfecting products, serving organizations such as product and chemical manufacturers, legal and investment firms, and trade associations
- Internationally recognized subject matter expert in hard surface and laundry cleaning and disinfection, including recent peer-reviewed publications, presentations at technical meetings, journal editorship, robust patent portfolio, and interviews by leading media organizations
- Nearly 3 decades' industrial formulation experience in two global consumer packaged goods companies, including laundry/cleaning/disinfecting formula development in wipes/sprays/liquids/pods/tablets/powders/gels/soft solids, testing, strategy development, and technical support for legal and regulatory functions (regulatory, patent, claims, and litigation)

Key Professional Positions Held

- Nancy A Falk PhD Formulation Consulting LLC, Bath, ME — 2021-present
  Principal and Founder
- Clorox Services Company, Cleaning Division Product Development, Pleasanton, CA — 2005-2021
  Research Fellow, Cleaning New Business Department, 2011-2021
  Associate Research Fellow, Laundry Product Development and Cleaning New Business Development, 2005-2011
- Unilever Home and Personal Care, North America, Detergents Research and Laundry Product Development, Edgewater, NJ — 1992-2005
  Senior Project Scientist, 1996-2005
  Senior Product Scientist, 1992-1996

Consulting Experience (2021-present)

- Guided technical partnering strategy development with global consumer packaged goods manufacturer
- Advised legal firm on patent litigation
- Partnered with formula development project teams in overcoming difficult performance and use experience challenges
- Advised multiple startup clients on sustainable chemistry formulation and delivery systems (including ready-to-use sprays, concentrates, wipes, powders, pods, and sheets) as well as suitable testing for claims substantiation, including EPA disinfectant registration

- Partnered with client and patent attorney on patent landscape for formula innovation
- Advised investment firms on trends in cleaning and disinfecting products and ingredients
- Advised formulation guidance software vendor on interface and data analysis
- Published and presented recent peer-reviewed technical papers on formulation modeling and sustainable feedstocks
- Session chair on AI/modeling/machine learning for AOCS Annual Meeting Surfactants and Detergents Division; wrote summary article for association magazine
- Interviewed by *Modern Retail*, *Cooks Illustrated*, *New York* (magazine), and Bloomberg News for expert perspective on cleaning products

Industrial Research Experience (1992-2021)

- Expert in sustainable chemistry for cleaning and disinfecting products, developed restricted substance list for division
- Constructed technology roadmaps for sustainable chemistry cleaning and disinfection; completed Gardner Technology Roadmap course
- Developed factbases for innovation proposals, including technology review, patent and white space analysis, and recommendations for path forward
- Developed or influenced the development of cleaning and disinfecting formulations for 13 national and international brands across liquid, gel, solid, soft-solid, nonwoven, powder, tablet, pod, water-soluble film, and aerosol formats
- Expert in formulating surfactants (anionic, cationic, nonionic, and zwitterionic), oxidants (peroxygen and hypochlorite), polymers (for performance and rheology), enzymes, fragrances, chelating agents, propellants, solvents, colorants, preservatives, and stabilizers—tackled challenging formulation projects and consulted on many projects within division
- Technical consultant on legal support within R&D function; extensive experience at technical review, searching, and analysis of patents for various business objectives, as well as factbase development for litigation support

Leadership Experience

- Senior Technical Editor, *Journal of Surfactants and Detergents* (Associate Technical Editor 2000-2015) — 2015-present
- The Clorox Company, R & D Division Leader of the Year Nominee — 2020,2021
- American Chemical Society (ACS) Colloid and Surface Science Division, leader of planning committee for industrial colloid science/career exploration symposium at two National Meetings — 2017-2020
- Household and Commercial Products Association (HCPA) — 2012-2016
  Cleaning Products Division Executive Board Member, 2012-2016
  Chair, Education Subcommittee, 2013-2016
  Chair, New Horizons 2014 conference
- Provided technical influence for Clorox Cleaning Division innovation and intellectual property strategies — 2012-2021
- Project leader on dozens of formulation, cost savings, and discovery projects, including cross-functional and external partnerships — 1992-2021

Education

Ph.D., Chemical Engineering, University of Texas at Austin, Austin, TX.

Dissertation: "The Bending Moment in Microemulsions: Curvature Dependence of Interfacial Free Energy"; adviser: Robert S. Schechter.

B.S.Ch.E., University of Washington, Seattle, WA.

Undergraduate research in aerosol particle dynamics in air flow; adviser: James Davis.

Affiliations/Memberships

- ACS, member of Colloid and Surface Science Division and Maine Local Section — 1985-present
- AOCS, member of Surfactants and Detergents Division — 1996-present
- CSPA (Antimicrobial Products Division and Cleaning Products Division) — 2013-2015, 2024-present

Recent Publications

- "Sodium hypochlorite in cleaning products: Effects on surfactant/oil/water formulations calculated from the hydrophilic–lipophilic difference model," *J Surf Deterg*, online Feb 11 2025.

- "Modeling, machine learning, and artificial intelligence in surfactants: Perspectives from the AOCS 2024 Annual Meeting," *Inform*, Jul-Aug 2024, p 14-17.
- "Impact of Non-Palm Triglyceride Feedstocks on Surfactant Properties and Consumer Product Applications," *J Surf Deterg*, (2024), 27, 837-845. Poster presented at AOCS Annual Meeting, Montreal, QE, Apr 28-May 1, 2024.
- "Fragranced consumer products: Formulation practices, related models, and recommendations for wider application of hydrophilic-lipophilic difference (HLD) application," *J Surf Deterg* (2023) 26 225-228. Also presented at AOCS Annual Meeting, Denver, CO, Apr 30-May 3, 2023.
- "Chlorine and Chlorine Compounds," with M. Macnaughtan, A. Taheri, and W. McCormick, in *Block's Disinfection, Sterilization, and Preservation*, 6th ed, (2021) G. McDonnell and J. Hansen, eds., 280-305.
- "Surfactants as Antimicrobials: A Brief Overview of Microbial Interfacial Chemistry and Surfactant Antimicrobial Activity," *J Surf Deterg* (2019) 22, 1119-1127. Also presented at 22nd International Symposium on Surfactants in Solution, Norman, OK, Jun 3-8, 2018.

Patent grants and applications

- "Acidic cleaning and disinfecting composition comprising citric acid, an anionic/APG surfactant mixture, and glycol ether solvent," with D. Scheuing, H. Day, S. Chen, B. Parrish, F. Frausto, E. Gharakhanian, and W. King, US 12203051.
- "Pre-Loaded Floor Wipes with Improved Pickup", with A. Jha, N. Dani, D. Scheuing, and B. Parrish, US 10,843,233, US 11,433,431, US 11,541,431, US 11,975,366, and US 20240246119.
- "Organic Acid Based Antimicrobial Formulations Containing Extremely Low Levels of Surfactant," with X. Guo, B. Ekert, and D. Scheuing, US 11,959,045 and US 20240218289.
- "Stable Activated Peroxide Sanitizing Liquid Compositions without Added Phosphorous Compounds or Cationic Surfactants," with T. Mui, E. Rumberger, X. Guo, F. Frausto, M. Capracotta, D. Pena Calderon, D. Scheuing, C. Dentinger, S. Gross, N. Norberg, S. Thamanna, US 11,932,833.
- "Disinfecting Formulations with Carvacrol," with C. Bell, W. King, M. Hashemi, N. Modi, K. Mainquist, X. Guo, W. Schenck, R. T. Anderson, K. Dickson, M. Lopez, G. Janssen, B. Parrish, C. Dentinger, and T. Fahlen, US 20230301299.
- "Synergistic Zn/Phenolic Solvent Formulations for Sanitization and Odor Control in Laundry," with S. Gross, S. Thamanna, F. Frausto, M. Capracotta, D. Pena Calderon, US 20230002703.
- "Acidic Cleaning and Disinfecting Compositions," with D. Scheuing, H. Day, S. Chen, B. Parrish, F. Frausto, E. Gharakhanian, and W. King, US 11,753,603.

- "Peroxide-Free Polymer and Surfactant Liquid Laundry Additive Compositions," with M. Capracotta, S. Gross, A. McDaniel, A. Rumjahn, and K. Salmon, US 10,093,884 (honored with a Clorox Annual Inventor Award).
- "Low-VOC Cleaning Substrates and Compositions Containing a Nonionic Surfactant," with J. Hope, W. Zhang, J. Heymann, M. Knock, M. Kinsinger, B. Hill, V. Ananth, and A. Jha, US 9,998,594.
- "Low-VOC Cleaning Substrates and Compositions," with S. Ojha, J. Heymann, V. Ananth, S. Coulter, A. Jha, and W. Zhang, US 20180216044.
- "Low-VOC Cleaning Substrates and Compositions Consisting of a Solvent Mixture," with J. Hope, W. Zhang, J. Heymann, M. Knock, M. Kinsinger, B. Hill, and V. Ananth, US 9234165.
- "Preloaded Dual Purpose Cleaning and Sanitizing Wipe," with J. Hope, W. Zhang, J. Heymann, M. M. Knock, M. Kinsinger, B. Hill, and V. Ananth, US 9,096,821.
- "Concentrated Film Delivery Systems," with M. Ochomogo, A. Garabedian, J. Diaz, and K. Johnson, US 8,232,238.
- "Method of Tumble Dryer Bleaching and Fabric Treatment," with R. Leon, W. Smith, and G. van Buskirk, US 8,008,247 and US 20110271457.
- "Natural Cleaners," with D. Scheuing, D. Lestage, E. Szekeres, and S. Kaur, US 7,939,486, US 7,939,487, US 20100234271, and US 20100056416.
- "Natural Heavy-Duty Cleaners,", with D. Scheuing, D. Lestage, E. Szekeres, and S. Kaur, US 7,608,573 and 7,618,931 (honored with a Clorox Annual Inventor Award),
- "Ultrasonically Bonded Nonwoven Permeable Pouch," with M. Privitera, S. Wood, G. van Buskirk, and D. Lestage, US 20080060741.
- "Shrink Sleeved Bottle," US 20050139568.
- "Fabric treatment device," with J. Griffiths, L. Mallon, and D. Fox, US 20050066542.
- "Fabric care compositions," with J. Brockett, D. Coccaro, M. Delroisse, K. Ellson, D. Murphy, M. Orchowski, S. Ugazio, and A. Wierenga, US 20030139309A1.
- "Fabric treatment article and method," with D. Murphy, M. Orchowski, D. Fox, and J. Ashley, US 7,018,976.
- "Dry bleach compositions," with P. Lam, US 6,773,625.
- "Isotropic liquid detergent containing hydrophobically modified polar polymers," with B. Bory, T. Padron, T. Vasudevan, D. Wolf, and J. Lum, US 5,723,434.

- "Isotropic liquids comprising hydrophobically modified polar polymers plus aliphatic hydrocarbon oils," with B. Bory, L. Morgan, T. Padron, T. Vasudevan, and D. Wolf, US 5,719,117.
- "Heavy duty liquid detergent composition comprising cellulase stabilization system," with M. Bae-Lee and T. Vasudevan, US 5,703,032.
- "Structured liquids containing selected isomers of secondary alcohol sulfate and a deflocculating polymer," US 5,529,724.