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## Work Address

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## Profile

After finishing a Postdoctorate at Cornell University in the lab of Dr. Martin Alexander, DuPont recruited me in 1991 to start up DuPont's environmental fate lab for industrial chemicals and to provide industrial microbiology for DuPont's businesses. After evolving my role from a lab operation to a corporate expert for environmental fate and microbiological issues, I moved from DuPont's technical career track to the management track. After taking on the role of Research Manager for DuPont's Environmental Fate & Microbiological Sciences, my group gained a well-recognized reputation both internally and externally for delivering on difficult projects of major importance to the corporation and other stakeholders. In addition to my management responsibilities, I also functioned as the corporate technical expert for strategies and planning related to environmental fate and effects of DuPont's chemicals. In September 2007, I was promoted to Global Environmental Sciences Leader with corporate leadership responsibility for DuPont's 3 Environmental Sciences groups - Environmental Fate & Exposure, Environmental Toxicology, and Applied & Environmental Microbiology. In 2014, I moved to the DuPont Biologicals Venture to start DuPont's Microbiome initiative. In 2016, I moved to the DuPont Nutrition & Biosciences business to form the Microbiome Competency and start microbiome initiatives in animal health and personal care. As of February 1, 2021, the DuPont Nutrition & Biosciences business merged with International Flavors & Fragrances (IFF), so I now affiliated with IFF. I lead the Microbiome & Microbiology competency for IFF. I have been on the NJ DEP Science Advisory Board since it started in 2010.

## Experience

**International Flavors & Fragrances (IFF) Health & Biosciences**
**Sr. Principal Scientist Technical Fellow –**
**Microbiome & Microbiology Leader**
**November 2021 – Present**

- Oversight of Microbiome related R&D projects for Human Health, Animal Health, and Personal Care assigned to Wilmington.
- Oversight of microbiology related R&D projects or services for IFF businesses.
- Management responsibility for personnel in the Microbiome & Microbiology competency.
- Internal consultant for environmental fate related initiatives.

**International Flavors & Fragrances (IFF) Health & Biosciences**
**Sr. Principal Scientist, Sr, Technical Fellow - Microbiome Platform**
**Feb. 1, 2021 - November 2021**
- Technical Project Leader for a variety of microbiome-related projects.

**Nutrition & Biosciences Sr. Technical Fellow 2018-Jan 31, 2021, DuPont - Nutrition & Biosciences**
- Technical Project Leader for a variety of microbiome-related projects
- E-Fate Consultant to DuPont corporate team identifying chemicals of emerging concern and Sustainability.

**Nutrition & Biosciences Technical Fellow 2016-2018 DuPont - Nutrition & Biosciences**
- Formed DuPont's Microbiome Competency
  - Consisting of genomics, bioinformatics, microbiology, molecular biology, biochemistry, fermentation, and data analytics, to enable a system biology capability for delivering microbiome-based benefits to the myriad of microbiome-related opportunities.
  - Technical Leader for DuPont's Microbiome initiatives **in** Crop Biologicals, Animal Health, and Personal Care.
  - Designed state-of-the-art Microbiome lab for DuPont-Wilmington.

**Sr. Principal Scientist 2014-2016 DuPont Biologicals Venture**
- Technical Leader for DuPont's Microbiome Initiative.
- Led DuPont's first microbiome project in the Crop Biologicals space.

**Global Environmental Sciences Leader, 2007 - 2013**
**DuPont Haskell Global Centers for Health & Environmental Sciences**
- Led the formation of the corporate Environmental Sciences organization which was formed by the merger and integration of DuPont's three Environmental Sciences groups:
  - Environmental Fate & Exposure
  - Applied & Environmental Microbiology
  - Environmental Toxicology
- In addition to administrative responsibilities, this role includes technical oversight of DuPont's Environmental Sciences programs plus technical leadership responsibilities such as leading:
- Development of environmental sciences strategies for new and existing chemicals within the DuPont chemical inventory.
- Strategic planning and implementation of alternative chemical assessment technologies (e.g., *in silica* & *in vitro).*
- Integrating environmental planning into biotechnology and nanotechnology **R&D** *I* initiatives.
- Received DuPont Sustainable Growth Excellence Award as part of the DuPont team that worked with Environmental Defense Fund to develop the Nano-Risk Framework.
- Nano-Risk Framework established a process that can be widely used by companies and other organizations to ensure the responsible development of nanomaterials.
  - Role on team was lead corporate environmental sciences expert for DuPont.
- Corporate environmental expert for DuPont's Nanotechnology Advisory Team.
- Invited by the Federal Government Inter-Agency Working Group of the National Nanotechnology Initiative-Nanotechnology Environmental and Health Implications (NNI-NEHI) to be one of two industrial representatives on the NNI-NEHI Planning Team for an upcoming NNI-NEHI workshop focused on assessing the state of the art of the science for "Nanomaterials and the Environment" and "Instrumentation, Metrology & Analytical Methods" as it relates to nanomaterials and the environment. This workshop is part of on-

going efforts to identify Environmental, Health, and Safety (EHS) research needs for the Federal Government.
- Leader of joint DuPont - BP Environmental team focused on biofuels.

**Research Manager, March 1999 - September 2007**
**DuPont Central Research & Development**
**Environmental Fate & Microbiological Sciences & Engineering**
During this time span, my group was part of:
- DuPont's Corporate Center for Engineering Research from 1999-2003, where we successfully focused on connecting biological sciences with engineering.
- DuPont's Biochemical Sciences & Engineering Division from 2003-September 2007, where we successfully focused on providing environmental and microbiological support for the industrial biotechnology R&D community.
- R&D Manager for the Environmental Fate & Microbiological Sciences & Engineering group within DuPont's Central Research & Development
- Group functions as corporate resource for providing:
- Environmental fate assessments and/or addressing environmental questions for DuPont's industrial chemicals.
- Environmental / industrial microbiology expertise for corporation.
- Mix of long-term R&D projects (typically 15+ per year) + short-term fire- fighting projects (typically 10+ per year).
- Viewed as DuPont corporate expert for environmental fate issues with responsibility for leading development of technical strategies to address e-fate issues.
- Led design of environmental fate studies plan for chemicals of regulatory interest.
- Member of Corporate Global Safety, Health, and Environment (SHE) Leadership Team - provided team with perspectives on potential environmental issues/concerns.
- Member of DuPont's internal Nanotechnology Advisory team with responsibilities for providing corporate-wide guidance on environmental aspects related to nanotechnology.
- Member of DuPont - Environmental Defense team that worked on a Product Stewardship Framework for nanotechnology- Role is DuPont's environmental fate and effects expert.
- Regulatory Interactions.
    - Worked with the US EPA to strongly influence the development of the US EPA PBT Profiler - i.e., Persistence, Bioaccumulation, Toxicity Screening Tool -which was based on the DuPont P&B Tool, which I developed for DuPont in the late 90s.
    - Served for three years as 1 of 3 industry experts on the Environment Canada Technical Advisory Group, which had responsibility for developing the technical strategy for prioritizing chemicals of concern (i.e., PBT assessment) on the Canadian Domestic Substances List.
    - Regularly invited to participate on EPA focus groups for chemical prioritization for environmental concerns.
    - BIAC representative on OECD-UNEP Council for Multimedia Modeling for estimating overall persistence and long-range transport.
    - Active participant in EPA ECA discussions for perfluorinated and served on EPA ECA Technical Experts Panel charged with developing an environmental fate/biodegradation plan for perfluorinated telomers.
    - Interactions with USDA - Plum Island related to DuPont molecular diagnostics project for detecting Foot & Mouth Disease in livestock.
    - Invited participant for EPA Endocrine Disruptor Screening Program; Priority- Setting Workshop.
- Technical Management responsibilities included the following competencies:
    - Environmental fate of DuPont Chemicals (products, product formulation components, process. chemicals, by-products, wastes, etc.).

- Determine how chemicals distribute in the environment upon release via emissions or product life cycles.
- Determine how industrial chemicals break down in the environment and what are the stable metabolites that may be found in the environment.
- Development of remediation technologies including bioremediation and phytoremediation.
- Evergreen development and maintenance of the DuPont P&B (Persistence & Bioaccumulation Prioritization Screening Tool and Database. Environmental/ Industrial Microbiology: Product development, biodegradable green products, preservation (antimicrobial) products, biocide efficacy in industrial processes, and molecular diagnostics for detection of microorganisms.
- Chair of the DuPont Wilmington Area Biosafety Committee.

**Senior Research Scientist 1995-1999 DuPont**

- Created DuPont P&B (Persistence & Bioaccumulation) Tool and database, which became the DuPont corporate standard for screening and prioritizing chemicals of concern. Received DuPont Sustainable Growth Excellence Award.
- With a recommendation from the U.S. EPA as a leading industrial expert for environmental assessment of chemicals in North America, I was invited by Environment Canada to participate on their Technical Advisory Group for developing the technical strategy/ plan for addressing the chemicals of concern prioritization of the Domestic Substances List (DSL). Environment Canada viewed the DSL as the most critical part of the Canadian Environmental Protection Act, which at the time was the largest legislation ever implemented by the Canadian Parliament.
- During the 1990's conducted biodegradability studies on more than 2,000 DuPont chemicals.
- Served as lead microbiologist on DuPont product development team for Biomax®, which is DuPont's hydro-biodegradable plastic product.
- Provided microbiology support to all DuPont businesses with focus on troubleshooting microbial contamination in industrial processes or products. Work included tracking sources of contamination, identifying effective biocides for eliminating problems, development of treatment and monitoring plan, and identifying chemicals in formulations of products or processes that served as nutrients for microorganism overgrowth.
- My team had a track record of 100% success for resolving hundreds of microbial contaminations in products or processes in the 90s and beyond. This included resolving an 18-year-old on-going microbial contamination problem that took the process up-time from 4 weeks to the desired one-year time needed for annual process maintenance.

**Research Scientist 1991-1995 DuPont**

- Initiated Microbiology programs described above.
- Successfully started DuPont's corporate environmental fate assessment lab for industrial chemicals. When EPA visited in 1995, they told us that DuPont was viewed as the #1 industrial lab for biodegradability assessment.
- Established links with the US EPA and other regulators to help DuPont's understanding of environmental fate needs with PMN submissions.
- Introduced DNA Fingerprinting technology to track microbial contamination in products or processes for DuPont and DuPont's customers.
- Solved a major microbial contamination problem in paint for DuPont customer - Ford Automotive -and Ford noted this by giving DuPont their vendor of the year award.
- Established in-house expertise for Indoor Air Quality (IAQ) and served as microbiologist on corporate team that addressed IAQ issues across DuPont globally.

## Education

**Postdoctoral Research Associate 1988-1991 Cornell University**

- Research Associate in the laboratory of Dr. Martin Alexander, a world-renowned expert for environmental fate and biodegradation of chemicals.
- Worked on EPA-funded project focused on understanding movement of microorganisms in soils and aquifers with respect to bioavailability and biodegradation of chemical contaminants.
- Six peer-reviewed publications

**Ph.D.** - New York University-Microbiology
**M.S.** - New York University - Microbiology
**B.S.** - St. Peter's University - Biology
**20 Credits** - Jersey City University- Computer Science