Michael Winningham, Ph.D.

Curriculum Vitae

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Summary of Experience

Research and Development Management:

- Research Manager of Organic Technologies Research Group at Corning Incorporated's Sullivan Park Research Institute, a world-renown materials science R&D center
- Functional manager of more than 20 scientists and technicians
- Technical leader on diverse early stage research and later stage development programs
- Solid track record in bringing cutting edge ideas and approaches to commercialization
- Initiated and maintained critical collaborations with a variety of industrial and university collaborators
- Served as intellectual property core team member for 3 Corning divisions including Optical Fiber, Life Sciences, and Science & Technology

Technical Expertise:

- Technical leader, innovator, and subject matter expert of functional polymers and coatings technology
- Demonstrated novel materials with unique optical, electrical, thermal and mechanical properties
- Associative materials and materials with reversible properties
- Radiation curing compositions and mechanisms, especially UV cure
- Optical fiber materials research and development
- Biomaterials and surface chemistry
- Inorganic/organic hybrid materials
- Physical organic chemistry and reaction mechanisms
- Coating adhesion mechanisms
- 20 issued US patents
- 13 external publications and presentations
- More than 40 Corning Incorporated technical reports

Professional Experience

2007-present **Corning Incorporated, Research Manager, Organic Technologies**

Research Manager, technical leader, and subject matter expert of organic materials research at Corning Incorporated's world-renown Sullivan Park Research Institute. Over the last several years had dramatically increasing research management responsibilities, where currently managing a group of more than 20 scientists and technicians.

Research efforts extend across all Corning business units and also includes New Business Development opportunities and exploratory research. Examples of research areas include radiation (UV) curable coating chemistries, organic semi-conductors, porosity control in ceramics, polymer crosslinking methodology, surface chemistry, 2D and 3D surfaces for cell attachment and proliferation, thin film membranes for separations, polymer processing, and synthesis of organic small molecules, oligomers and polymers.

Intellectual property core team member for Science & Technology division of Corning. Invention disclosures from throughout S&T are received and reviewed for completeness and assigned a patent filing rating, where core team members also serve as the interface between inventors and patent attorneys. Had also served on Corning Life Sciences intellectual property core team.

2005-2007 **Corning Incorporated, Development Manager, Corning Optical Fiber**

Development Manager of the Coating Development Group, Corning Optical Fiber division. Functional manager, technical leader, and subject matter expert in the area of optical fiber coating materials. Managed a group of several scientists and technicians where group focused on developing and transferring new optical fiber coating technology into manufacturing. Reinvigorated mission and strategy of Coating Development Group after a major reorganization. Developed a coating technology roadmap for Corning Optical Fiber division.

Executed a strategy of co-development of fiber coating technology with industrial partner. Efforts led to the introduction of a new and advantaged optical fiber coating system that was integrated into the majority of Corning's optical fiber products.

Intellectual property core team member and subject matter expert for Corning Optical Fiber division. Invention disclosures were received and reviewed for completeness and assigned a patent filing rating. Also helped to maintain patent portfolio with respect to optical fiber coating technology.

2003-2005 **Corning Incorporated, Development Associate, Corning Optical Fiber**
Recognized subject matter expert in radiation (UV) curable coating chemistry mechanisms, formulation, and product development, especially in the area of optical fiber coatings. Coating formulation technical leader of novel coating development program, where invented, developed, and transferred state of the art coating technology. Efforts led to the commercialization of new fiber products which incorporated Corning's CPC®7 coating technology. After nearly a decade since the first introduction of CPC®7, it continues to be the "gold standard" with industry-leading microbend attenuation performance.

Advanced understanding of how optical fiber coatings influence reliability of optical fiber under high power conditions. Determined that hydrophilic primary optical fiber coatings could enable stripable optical fibers with high mechanical reliability. Invented new coating technology that could applied to optical fibers at very high line speeds.

Helped to initiate program with Corning Life Sciences to research and develop UV curable coatings for culture of hESCs. Identified UV curable adhesive chemistries that were compatible with microwell cell growth plate products.

1997-2003 **Corning Incorporated, Research Scientist, Corning Telecommunication Products Division**
Hired into Corning's Telecommunication Products Division (now Corning Optical Fiber) as part of an initial effort to internally develop new coating technologies with advantaged properties, that facilitate manufacturability, and yield fiber products with high reliability. Started as the technical leader of primary optical fiber coating development and subsequently supervised all new optical fiber coating formulation efforts. Team developed advantaged coating system and demonstrated manufacturing feasibility. Helped transfer new coating technology to a coating toll manufacturer and helped to execute several scale-up campaigns.

1991-1997 **Cornell University, Graduate Student, Department of Chemistry**
Dissertation: "Templated Parallel Beta-Sheets in Hybrid-Peptide Polyamides"
Determined the propensity of beta-sheet formation of peptides attached to rigid aromatic moieties. Phenoxathiin derivatives were designed, synthesized, and shown to readily template desirable hydrogen bonding interactions between adjacent peptide segments. Through careful physical organic studies the nature of these hydrogen bonding interactions were elucidated. Novel, high molecular weight, hybrid-peptide polyamides were designed, synthesized, and fully characterized.

1990-1991 **Northwestern University, Undergraduate Research Assistant**
The optimization of solid phase oligonucleotide synthesis on alkylamine CPG supports containing an oxalyl linker was explored.

1990 **Eli Lilly and Company, Summer Science Intern**

Enantioselective synthesis of Lometrexol was achieved where lipase-catalyzed enantioselective esterification of a 1,3-propanediol derivative was utilized to introduce the desired stereochemistry in high enantiomeric excess. Results were published in the Journal of Organic Chemistry.

Education

1997	Ph.D.	Cornell University, Department of Chemistry Dissertation: "Templated Parallel Beta-Sheets in Hybrid-Peptide Polyamides"
1993	M.S.	Cornell University, Department of Chemistry
1991	B.A.	Northwestern University, College of Arts and Sciences Graduated with honors

Awards and Leadership Training

2011	Corning Incorporated	Global Leadership Assessment and Coaching
2009	Corning Incorporated	Kaplan Devries Leadership Development
2006	Corning Incorporated	Dimensions of Leadership
2006	Corning Incorporated	Operations Excellence Award
1999	Society of Plastics Engineers	Frank Giblin Memorial Award in Polymer Analysis
1992-1995	Cornell University	NIH Biotechnology Training Grant
1991	Northwestern University	Graduated with honors
1991	Northwestern University	Chemistry Department Scholar Award

Publications and Presentations

1. "Electrospray Ionization Mass Spectrometry in the Analysis of Reaction Products of Organotin Complexes", Burkhalter, Robert S; Hogue, Carrie L; Sonner, Susan M; Winningham, Michael J, *To be presented at the 60th ASMS Conference on Mass Spectrometry and Allied Topics.*

2. "Controlled Tin Catalyzed Hydrolysis of 3-Acryloxypropyltrimethoxysilane with Mono- and Multifunctional Mercaptans", Winningham, Michael J; Burkhalter, Robert S; Hogue, Carrie L; Sonner, Susan M; Youngman, Randall E; Smith, Diane, *To be submitted to Journal of Organometallic Chemistry.*

3. **"**Mechanical Failure of Bent Optical Fiber Subjected to High Power", Glaesemann, G. Scott; Winningham, Michael J.; Clark, Donald A.; Coon, Jeffrey; DeMartino, Steven E.; Logunov, Stephan L.; Chien, Ching-Kee, *Journal of the American Ceramic Society* (2006), 89(1), 50-56.

4. **"**Aged Fiber Strength and Adhesion Behavior of Fibers Containing Hydrophilic Primary Coatings", Winningham, Michael J.; Fabian, Michelle D.; McCarthy, Kevin R.; Dietrich, Candace R.; Simonton, Kristi L.; Westbrook, Jamie T.; Hill, Daniel W., *Proceedings of International Wire and Cable Symposium* (2004), 53rd, 288-295.

5. **"**Use of Laser Spallation to Measure the Adhesion of Optical Fiber Coatings", Logunov, Stephan; Kouzmina, Inna; Winningham, Michael; Fewkes, Edward, *Journal of Applied Polymer Science* (2004), 93(5), 2459-2468.

6. **"**Unnatural Functional Biopolymers Inspired by Nature", Sogah, Dotsevi Y.; Wong, W.-H.; Brandenburg, C. J.; Winningham, M. J., *Abstracts of Papers, 224th ACS National Meeting*, Boston, MA, United States, August 18-22, 2002 (2002), ORGN-822.

7. **"**A Novel Silk-Based Segmented Block Copolymer Containing GlyAlaGlyAla b-Sheets Templated by Phenoxathiin", Rathore, Osman; Winningham, Michael J.; Sogah, Dotsevi Y., *Journal of Polymer Science, Part A: Polymer Chemistry* (2000), 38(2), 352-366.

8. **"**Solid State FTIR Analysis of Hydrogen-Bonded Domains in Synthetic Biopolymer Hybrid Silk-Like Materials", Sogah, D. Y.; Claussen, R. C.; Winningham, M. J.; Rathore, O., *Annual Technical Conference - Society of Plastics Engineers* (1999), 57th(Vol. 2), 2180-2184.

9. **"**Bioinspired Advanced Materials: Design, Synthesis and Properties of Silk-Based Peptide Hybrid Polymers", Sogah, D. Y.; Claussen, R. C.; Winningham, M. J.; Rathore, O., *Book of Abstracts, 217th ACS National Meeting*, Anaheim, Calif., March 21-25 (1999), BTEC-071.

10. **"**A Modular Approach to Polymer Architecture Control via Catenation of Biomolecular Lego Sets. Polymers Containing Templated b-Sheets", Winningham, Michael J.; Sogah, Dotsevi Y., *Polymeric Materials Science and Engineering* (1997), 76, 156-157.

11. "A Modular Approach to Polymer Architecture Control via Catenation of Prefabricated Biomolecular Segments: Polymers Containing Parallel b-Sheets Templated by a Phenoxathiin-Based Reverse Turn Mimic", Winningham, Michael J.; Sogah, Dotsevi Y., *Macromolecules* (1997), 30(4), 862-876.

12. "Evidence for Intramolecular Hydrogen Bonding in b-Alanine Derivatives of 2,8-Dimethylphenoxathiin 4,6-Dicarboxylic Acid. Model Studies for Nucleation of Parallel b-Sheets", Winningham, Michael J.; Sogah, Dotsevi Y., *Journal of the American Chemical Society* (1994), 116(24), 11173-4.

13. "Asymmetric Synthesis of Lometrexol ((6R)-5,10-Dideaza-5,6,7,8-tetrahydrofolic Acid)", Barnett, Charles J.; Wilson, Thomas M.; Wendel, Samuel R.; Winningham, Michael J.; Deeter, Jack B., *Journal of Organic Chemistry* (1994), 59(23), 7038-45.

Patents

1. "Optical Fiber Ribbon with Improved Stripability", Chien, Ching-Kee; Fabian, Michelle Dawn; Fewkes, Edward John; Winningham, Michael James, US 7,923,483.

2. "Optical Fiber Coating System and Coated Optical Fiber", Fabian, Michelle D; Fewkes, Edward J; Sheng, Huan-Hung; Winningham, Michael J, US 7,715,675.

3. "Optical Fiber Coating Compositions", Chien, Ching-Kee; Fewkes, Edward J; Gasper, Susan M; Hill, Anita S; Jacobs, Gregory F; Wagner, Frederic C; Winningham, Michael J; Youngman, Randall E, US 7,676,130.

4. "Fast Curing Primary Optical Fiber Coatings", Winningham, Michael James, US 7,423,105.

5. "Optical Fiber Ribbon with Improved Stripability", Chien, Ching-Kee; Fabian, Michelle Dawn; Fewkes, Edward John; Winningham, Michael James, US 7,289,706.

6. "Optical Fiber Ribbon with Improved Stripability", Chien, Ching-Kee; Fabian, Michelle Dawn; Fewkes, Edward John; Winningham, Michael James, US 7,257,299.

7. "Method of Preventing Optical Fiber Failure in High Power Application", DeMartino, Steven E.; DeRosa, Michael E.; Glaesemann, Gregory S.; Logunov, Stephan L.; Neukirch, Ulrich W. H.; Winningham, Michael J., US 7,239,785.

8. "Coated Optical Fiber and Optical Fiber Coating System Including a Fast-Gelling Primary Coating", Baker, Linda S.; McCarthy, Kevin R.; Winningham, Michael J.; Wu, Lung-Ming, US 7,221,842.

9. "Fiber Optic Articles, Assemblies, and Cables Having Optical Waveguides", Lochkovic, Gregory A.; Cooper, Sheila A.; Josey, Leigh R.; Register, III, James A.; Self, Larry W.; Fewkes, Edward J.; Winningham, Michael J.; Sheng, Huan-Hung; Fabian, Michelle D., US 7,050,688.

10. "Coated Optical Fiber and Optical Fiber Coating System Including a Fast-Gelling Primary Coating", Baker, Linda S.; McCarthy, Kevin R.; Winningham, Michael J.; Wu, Lung-Ming, US 7,010,206.

11. "Coated Optical Fiber and Optical Fiber Coating System Including a Hydrophilic Primary Coating", Fabian, Michelle D.; McCarthy, Kevin R.; Winningham, Michael J., US 7,010,205.

12. "Optical Fiber with an Improved Primary Coating Composition", Schissel, David N.; Winningham, Michael J., US 6,849,333.

13. "Secondary Coating Composition for Optical Fibers", Botelho, John W.; Jacobs, Gregory F.; Sheng, Huan-Hung; Winningham, Michael J., US 6,775,451.

14. "Optical Fibers Prepared with a Primary Coating Composition Including a Monomer with a Pendant Hhydroxyl Functional Group", Winningham, Michael J., US 6,563,996.

15. "Optical Fiber Coating", Fewkes, Edward J.; Jacobs, Gregory F.; Winningham, Michael J., US 6,559,197.

16. "Composition Containing Tackifier and Method of Modifying Time-Sensitive Rheological Properties of Optical Fiber Coating", Fewkes, Edward J.; Jacobs, Gregory F.; Jones, Kenneth R.; Sheng, Huan-Hung; Wagner, Frederic C.; Winningham, Michael J., US 6,539,152.

17. "Methods of Drying Optical Fiber Coatings", Jacobs, Gregory F.; Winningham, Michael J., US 6,534,618.

18. "Fast Curing Primary Optical Fiber Coating", Winningham, Michael J., US 6,531,522.

19. "Coating Composition for Optical Fibers", Chien, Ching-Kee; Fewkes, Edward J.; Jacobs, Gregory F.; Jones, Kenneth R.; Urruti, Eric H.; Winningham, Michael J., US 6,326,416.

20. "Coating Composition for Optical Fibers", Chien, Ching Kee; Fewkes, Edward J.; Urruti, Eric H.; Winningham, Michael J., US 6,316,516.