

FRASER F. FLEMING, PH.D.

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Professor and Head of Department

Department of Chemistry

Drexel University

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Synopsis: Professor and Head of Department at Drexel University. A research focus in organic chemistry, training doctoral, graduate, and undergraduate students who have generated more than 80 publications, with >\$3M in research funding from NSF and NIH. Experience in strategic planning, developing vision and mission statements, faculty and student development, and leading committees. Cross-disciplinary experience in teaching and course development. Leader, efficient, organized, team builder, and strategic thinker. Long term interests in creativity, mentoring, religion, international programs, and teamwork.



I. ADMINISTRATIVE LEADERSHIP

A. Government - NSF

1. Program point person for the Chemical Heritage Program – funds chemical advances with applications in the preservation, restoration, and characterization of artistic materials.
2. Program Lead for the Chemical Synthesis Program – oversight of \$20M budget
3. Program Director in the Chemical Catalysis Program – oversight of 60 grants
4. Co-organized the NSF-ACS symposium "Emerging Frontiers in Synthesis"
5. Graduate Education Working Group – Assisted in writing a response to changes in graduate education proposed by the American Chemical Society
6. Hiring committee for a Program Director for chemical education in the Division of Undergraduate Education, August 2014.
7. Funding and mentoring presentation and panel discussion as part of the "Post-doc to faculty" conference organized by the American Chemical Society, San Francisco, CA, 8 August, 2014.
8. Funding advice presentation to American Association of Colleges of Pharmacy faculty fellows – Rockville, MD, 12 March, 2014.
9. Reviewer Recruiting Working Group – Assisted in developing a web-based recruiting tool.
10. Participated in the Federal Interagency Chemistry Representatives Meeting, April 8, NIH, Bethesda.

B. Interdepartmental

1. Created a partnered lecture circuit with U. Pittsburgh, West Virginia U., and Duquesne University (2008 - 2013). Extended to Temple U. and U. Pennsylvania in 2012.

2. Developed a joint Forensic Science and Chemistry seminar series (2011 - 2013)
3. Led a successful joint project between the School of Pharmacy and the Department of Chemistry for NSF funding of an NMR spectrometer (\$383,765. 2005 - 2008).

C. University

1. Presidential Excellence Awards Committee (Spring 2011 - 2013). Evaluated and ranked faculty portfolios from diverse disciplines.
2. Education Technology Committee (2008 - 2009). Developed an implementation plan for new technology updates.
3. Bayer School Tenure and Promotion Committee (2007 - 2013, Chair 2010 - 2013).
4. Member of the Provost's "Associate Academic Vice President Search Committee." (Fall 2006 - Spring 2007).
5. University Grievance Committee (1999 - 2003). Processes faculty grievances, particularly tenure and promotion issues.

D. Departmental

1. Graduate Curriculum Committee (2011 - 2013)
2. Ethics Committee (2011 - 2013)
3. Strategic Planning Committee (2010 - 2011)
4. Personnel Committee (2006 - 2009) – Recommended faculty salary increases.
5. Internal Review Committee (2004 - 2006 Co-Chair, 2012 – 2013 Chair)
6. Space Committee Chair (1999 - 2004, Chair)
7. Personnel Committee (1999 - 2002) - Recommended faculty salary increases.
8. Faculty Searches - Participated in over 10 searches.
9. Seminar Committee (1995 – 1999, 2003 – 2011) –Seminar series coordinator.

E. Diversity

1. Assembled multiple NSF grant review panels with greater than 30% women participants, a considerable accomplishment in the highly male dominated of organic chemistry.
2. Mentored post-doctoral fellow Jesús Armando Luján-Montelongo and helped prepare him for an independent faculty position.

F. Outreach

1. Moderator for CAFÉ – Christian Academic Fellowship (1999 -2008, 2011-2013). Organized campus visits with joint sponsorship from diverse campus units.
2. Chairman of Jabez Foundation (2011-2012) – A non-profit organization overseeing church property.
3. Organized exploration of industrially funded partnerships with Advanced Polymer Technology Corp.
4. Organized industrial site visits for sophomore students.

G. Training

1. Supporting Minority Faculty – NSF presentation.
2. Negotiating – NSF sponsored course.
3. Covey Project Management Essential – two 4h training sessions.
4. Covey Time Management – two 3h training sessions.
5. People Problem Solving Skills - 21h training workshop and 4h reprise.
6. Aspiring Leaders Management Training – 16h training workshop.
7. Taking a Scientific Approach to Science Education – Nobel Laureate Carl Wieman
8. Management for Aspiring Leaders – 16h training workshop.

II. PROFESSIONAL EXPERIENCE

A. Education

Oregon State University Alkaloid synthesis and veterinary medicine collaboration.	Post-doctoral fellow	1990-1992
University of British Columbia (Canada) Palladium-catalysis and natural product synthesis.	Ph.D. Organic Chemistry	1990
Massey University (New Zealand) Preparation of ion exchange resins for isolating heparin.	B.S. (Hons.) Chemistry	1986

B. Work History

Professor and Head of Department	Drexel University	2015 – present
Program Director	National Science Foundation	2013 - 2015
Visiting Professor	Goteborg University	2010 Summer
Visiting Professor	Ludwig-Maximilians-University	2010 Spring
Professor of Chemistry	Duquesne University	2007 - present
Visiting Professor	Ludwig-Maximilians-University	2006 Spring
Visiting Professor	Ludwig-Maximilians-University	2003 Spring
Adjunct Professor – Arts and Science	Duquesne University	2001
Associate Professor of Chemistry	Duquesne University	1999 - 2007
Assistant Professor of Chemistry	Duquesne University	1992 - 1999
Post-doctoral Fellow	Oregon State University,	1990 - 1992
Killam Graduate Fellow	University of British Columbia	1986 - 1990

III. TEACHING ACTIVITIES (3 publications, 2 grants, taught >10 courses in science and arts)

A. Graduate Courses Taught

716-MLS	Science, Technology, & Society	College of Liberal Arts
611-CHEM	Sp. Topics: Chemistry of Heterocycles	Bayer School of Science
534-CHEM	Applied Basic NMR Techniques	Bayer School of Science
611-CHEM	Sp. Topics: Synthetic Methods	Bayer School of Science
611-CHEM	Sp. Topics: Natural Products	Bayer School of Science
611-CHEM	Sp. Topics: Stereochemistry	Bayer School of Science

B. Undergraduate Courses Taught

200W-IHP	Science, Religion, & Society	College of Liberal Arts
200W-IHP	Science, Religion, & the Environment	Bayer School of Science
205 -R-CHEM	Organic Chemistry I Recitation	Bayer School of Science
205-CHEM	Organic Chemistry I	Bayer School of Science
206-CHEM	Organic Chemistry II	Bayer School of Science
211H-CHEM	Organic Chemistry I – Honors	Bayer School of Science
211H-CHEM	Organic Chemistry II – Honors	Bayer School of Science
221-CHEM	Organic Chemistry I Laboratory	Bayer School of Science
222-CHEM	Organic Chemistry II Laboratory	Bayer School of Science
107 SPRG	The History of Science and the Influence of Religion	Bayer School of Science

C. Academic Advisement

Post-Doctoral Associates Advised

1. Saidi Vangala (PDF June 2014 – December 2014)
2. Jesus Armando Lujan Montelongo (2011 - 2013) Faculty at Cinvestav, Mexico
3. Ehecatl Luis David Paleo González (2012)
4. Krishanu Ray (2011)
5. Bhaskar Reddy Pitta (2009 - 2011) Research Scientist at Biophore Pharmaceuticals (India).
6. Ravikumar Chandrababu (2007 - 2010) Founding member of the Chemistry Department, IIT Mandi, India.
7. Viet Anh Vu (2003 - 2005) Manager at Degussa Inc. Vietnam
8. Moshfiqur Rahman (2002 - 2003) NAEJA Pharmaceutical in Edmonton.
9. Ramazan Altundas (1999 - 2002) Faculty at Ataturk University

Graduate Student Theses Advised

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| 1. Dinesh Nath (2013 Ph. D.) | Research Scientist at Chevron Phillips |
| 2. Matthew Purzycki (2012 MS) | Seeking employment in New Jersey |
| 3. Lihua Yao (2011 MS) | Scientist at Mylan Pharmaceuticals |
| 4. Ping Lu (2010 MS) | MS Information Technology U. Akron |
| 5. Wang Liu (2008 Ph. D.) | Scientist at SciFinder |
| 6. Guoqing Wei (2007 Ph. D.) | Post-doc at U. Pittsburgh with Ted Cohen |
| 7. Subrahmanyam Gudipati (2007 MS) | Scientist at Merck |
| 8. Yunjing Wei (2007 MS) | Scientist at Pfizer |
| 9. Somraj Ghosh (2007 MS) | Completing a Ph.D. in Pharmacy |
| 10. Zhiyu Zhang (2004 Ph. D.) | Research Scientist at Adesis Inc. |
| 11. Pravin Iyer (2003 MS) | Medicinal Chemist at Roche Pharmaceuticals. |
| 12. Lee Funk (2002 MS) | Scientist at Mylan Pharmaceuticals. |
| 13. Yong Tu (2002 MS) | Scientist at Bristol-Meyers Squibb |
| 14. Venugopal Gudipati (2002 MS) | Research Scientist at Albany Molecular |
| 15. Brian Shook (2001 Ph.D.) | Research Scientist at Johnson and Johnson. |
| 16. Vinod Kulkarni (2001 MS) | Not known. |
| 17. Qunzhao Wang (2001 Ph.D.) | Research Professor UNC School of Pharmacy. |
| 18. Jianping Guo (1998 MS) | Scientist at Millenium. |
| 19. Vaqar Sharif (1998 MS) | Scientist at Incyte. |
| 20. Tao Jiang (1998 MS) | Scientist at a start-up company in San Diego. |
| 21. Yifang Pu (1997 MS) | Homemaker |
| 22. Zahid Hussain (1996 MS) | Scientist at Pharmacopia |
| 23. Joshua J. Pak (1995 MS) | Faculty member at Idaho State University. |
| 24. Huang, A. (1995 MS) | Professor at Williams College. |

Undergraduate Research Students Advised

1. Angel Ojeda Estevez (Spring 2013 – Summer 2014)
2. Matthew DeStefano (Summer 2012)
3. Shelby Sharpnack (2011 Fall)
4. Regina Dutz (2011 Fall)
5. Michael Werkmeister (2011 Spring - Fall)
6. James Sutherland (2010 and 2009 Summer)
7. Kenneth Drombosky (Spring 2010)

8. Kimberley Daley (Fall 2009)
9. Zachary Otaibi (2007 Fall - Spring 2009)
10. Brian Franz (2008 Summer, continuing at Mercyherst College)
11. Austin Bowen (2007 August - December)
12. Brian Zlobecki (2007 January - December, completed a BS at DU)
13. Kristen Carlisle (Summer 2007)
14. Daffydd Moore (Summer 2007)
15. Jenna Daggett (2005, completed a BS at DU)
16. Julie Reisz (Summer 2005)
17. April Pyle (2005, completed a BS at DU)
18. Bridgette Bartko (2005, completed a BS at DU)
19. Christopher Morgan (2002, completed a BS at DU)
20. Kristin Waltman (2002, completed a BS degree at DU and an MS at U. Colorado)
21. Michael DeCoske (2001 - 2002, completed the Pharm. D. program at DU)
22. John Rishel (2000 - 2002, completed a BA at DU – scientific safety advisor)
23. Kristy Enz (Summer 2000, completed a BS at DU)
24. Brian Ahead (1998 - 1999, completed a BS at DU, financial consultant)
25. Lee Kim (1993 - 1994, completed a BS at DU and is currently practicing law)
26. Damean Freas (1993 - 1994, completed a BS at DU and practicing medicine)
27. Ingrid Zhang (Summer 1993)
28. Todd Hays (Summer 1993, completed a Pharm. D.)

Current Research Students

1. Sergey Chepyshev (PDF 2013 - present)
2. Yajun Li (PDF September 2014 – present)
3. Embarek Alwedi (PDF September 2014 – present)
4. Xun Yang (3rd year graduate student - Ph.D.)
5. Allen Chao (1st year graduate student - Ph.D.)

D. Teaching Publications

1. "Oxonitriles: Four-step Ozonolysis, Aldol, Conjugate Addition, and Enolate Acylation Sequence " *Comprehensive Organic Chemistry Experiments for the Laboratory Classroom (COCELC)*, Royal Society, **2014**, *accepted*.
2. "Sink Inserts for Flood Prevention" Fleming, F. F.; Bodnar, D. J.; Hardesty, D. L. *J. Chem. Ed.* **2004**, *81*, 1344.
3. "Flood Prevention by Recirculating Condenser Cooling Water" Fleming, F. F.; Iyer, P. S. *J. Chem. Ed.* **2001**, *78*, 946.
4. "No Small Change: Cooperative Learning in a Microscale Organic Course", Fleming, Fraser F. *J. Chem. Ed.* **1995**, *72*, 719-720.

E. Teaching Grants

1. "Faculty Development Grants for a Summer Program" Office of International Programs, \$2,000, 2010.
2. "A Cooperative Learning Approach to Microscale Experiments" "Hunkele Instructional Innovation Grant," \$1,500, 1993.

F. Teaching Presentations

1. "Caring for People in the Undergraduate Laboratory", Fleming, F.F. *49th Annual Meeting of the American Scientific Affiliation, St. Paul, MN, July 29-August 1, 1994 (Poster)*.

2. "Cooperative Learning in the Undergraduate Laboratory", Fleming, F.F. *Duquesne University Cooperative Learning Conference, Pittsburgh, PA, May 9, 1994 (Poster)*.

G. Other Teaching Activities

1. Developed a summer study abroad course "The History of Science and the Influence of Religion."
2. Co-developed three courses in science and religion "Science, Technology, & The Environment" 200W-IHP, "Science, Religion, & Society" 200W-IHP, and "Science, Technology, & Society" 716-MLS.
3. Developed "Organic Chemistry: Stereoelectronic Control in Reaction Mechanisms" as an undergraduate text for use at Duquesne University.
4. Developed several graduate course: "Sp. Topics: Synthetic Methods" CHEM 641, "Sp. Topics: Natural Products." CHEM 641, "Applied Basic NMR Techniques" CHEM 534. All count toward the Ph. D. in Medicinal Chemistry within the Graduate School of Pharmacy as well as for the Ph. D. in Chemistry.
5. Instituted a new microscale laboratory course that specifically incorporates cooperative learning techniques. Comprehensive surveys indicated high student learning and satisfaction with the course. An article published in *J. Chem. Ed.* **1995**, 72, 719-720 fully described both the course and the resultant surveys.
6. Developed a series of site visits for undergraduates to experience local chemical industry. This program resulted in several students changing their majors to pursue degrees in chemistry.

H. Teaching Honors and Awards

1. Hunkele Creative Teaching Award (Duquesne University, 1995)

IV. SCHOLARSHIP (>80 publications, 2 patents, >\$3M)

A. Scholarly Publications

1. Published or Accepted Articles

1. "Enantioselective Installation of Quaternary Centers in Cyclic Oxonitriles" Gunes, Y.; Arcelik, N.; Sahin, E.; Fleming, F. F.; Altundas, R. *Eur. J. Org. Chem.* **2015**, 81, *in press*.
2. "Chemoselective Alkylations with *N*- and *C*-Metalated Nitriles" Yang, X.; Nath, D.; Fleming, F. F. *Org. Lett.* **2015**, *pending revision*.
3. "Metalated Nitriles: S_{Ni} Cyclizations with a Propargylic Electrophile" Lu, P.; Pakkala, V. S.; Evanseck, J.; Fleming, F. F. *Tetrahedron Lett.* **2015**, 56, 3216-3219.
4. "Alkyl Sulfinates: Formal Nucleophiles for Synthesizing TosMIC Analogs" Montelongo, J. A. L.; Estevez, A. O.; Fleming, F. F. *Eur. J. Org. Chem.* **2015**, 1602-1605.
5. "Arylthio-Metal Exchange of α -Arylthioalkanenitriles" Nath, D.; Skilbeck, M.; Coldham, I.; Fleming, F. F. *Org. Lett.* **2014**, 16, 62-65.
6. "Dithiolopyranthione Synthesis, Spectroscopy, and an Unusual Reactivity with DDQ" Pimkov, I. V.; Nigam, A.; Venna, K.; Fleming, F. F.; Solntsev, P. V.; Nemykin, V. N.; Basu, P. *J. Heterocyclic Chem.* **2013**, 50, 879-886.
7. "Metalated Nitriles: S_{Ni} and S_{Ni} Installation of Contiguous Quaternary-Tertiary and Quaternary-Quaternary Centers" Lujan-Montelongo, J. A.; Lu, P.; Liu, W.; Fleming, F. F. *Chem. Eur. J.* **2013**, 19, 8746-8750.

8. "Metalated Nitriles: *N*- and *C*-Coordination Preferences of Li, Mg, and Cu Cations" Purzycki, M.; Liu, W.; Hilmersson, G.; Fleming, F. F. *Chem. Commun.* **2013**, *49*, 4700-4702.
9. "Preparation of 3-Oxocyclohex-1ene-1-carbonitrile" Lujan-Montelongo, J. A.; Fleming, F. F.; Hughes, D. *Org. Synth.* **2013**, *90*, 229-239.
10. "Sulfinylnitriles: Sulfinyl-Metal Exchange-Alkylation Strategies" Nath, D.; Fleming, F. F. *Chem. Eur. J.* **2013**, *19*, 2023-2029.
11. " γ - and δ -Hydroxynitriles: Diastereoselective Electrophile-Dependent Alkylations" Mycka, R. J.; Eckenhoff, W. T.; Steward, O. W.; Barefoot, N. Z.; Fleming, F. F. *Tetrahedron*, **2013**, *69*, 366-376.
12. "Cyclohexylcarbonitriles: Diastereoselective Arylations with $\text{TMPZnCl}\cdot\text{LiCl}$ " Mycka, R. J.; Duez, S.; Bernhardt, S.; Heppekausen, J.; Knochel, P.; Fleming, F. F. *J. Org. Chem.* **2012**, *77*, 7671-7676.
13. "Transmissive Olefination Route to Putative 'Morinol I' Lignans" Yao, L.; Pitta, B.; Ravikumar, P. C.; Purzycki, M.; Fleming, F. F. *J. Org. Chem.* **2012**, *77*, 3651-3657.
14. "Nitrile Alkylations through Sulfinyl-Metal Exchange" Nath, D.; Fleming, F. F. *Angew. Chem., Int. Ed.* **2011**, *50*, 11790-11793.
15. "Alkenenitrile Transmissive Olefination: Synthesis of the Putative Lignan "Morinol I"" Fleming, F. F.; Liu, W.; Yao, L.; Pitta, B.; Purzycki, M.; Ravikumar, P. C. *Eur. J. Org. Chem.* **2011**, 6843-6846.
16. "Pd-Catalyzed α -Arylation of Nitriles and Esters and γ -Arylation of Unsaturated Nitriles using $\text{TMPZnCl}\cdot\text{LiCl}$ " Duez, S.; Bernhardt, S.; Heppekausen, J.; Fleming, F. F.; Knochel, P. *Org. Lett.* **2011**, *13*, 1690-1693.
17. "Enantioselective Synthesis of Cyclic, Quaternary Oxonitriles" Güneş, Y.; Polat, M. F.; Sahin, E.; Fleming, F. F.; Altundas, R. *J. Org. Chem.* **2010**, *75*, 7092-7098.
18. " γ -Hydroxynitrile Alkylations: Electrophile-Dependent Stereoselectivity" Mycka, R. J.; Steward, O. W.; Fleming, F. F. *Org. Lett.* **2010**, *12*, 3030-3033.
19. "Metalated Nitrile and Enolate Chlorinations" Pitta, B. R.; Fleming, F. F. *Org. Lett.* **2010**, *12*, 2810-2813.
20. "Allylic and Allenic Halide Synthesis via NbCl_5 - and NbBr_5 -Mediated Alkoxide Rearrangements" Ravikumar, P. C.; Yao, L.; Fleming, F. F. *J. Org. Chem.* **2009**, *74*, 7294-7299.
21. "Cyclohexanecarbonitriles: Assigning Configurations at Quaternary Centers From ^{13}C NMR CN Chemical Shifts" Fleming, F. F.; Wei, G. *J. Org. Chem.* **2009**, *74*, 3551-3553.
22. "Direct Conversion of Aldehydes and Ketones to Allylic Halides by a NbX_5 -[3,3] Rearrangement" Fleming, F. F.; Ravikumar, P. C.; Yao, L. *Synlett*, **2009**, 1077-1080.
23. "Metalated Nitriles: Internal 1,3-Asymmetric Induction" Fleming, F. F.; Liu, W. *Eur. J. Org. Chem.* **2009**, 699-708.
24. "Metalated Nitriles: Stereodivergent Cation-Controlled Cyclizations" Fleming, F. F.; Wei, Y.; Liu, W.; Zhang, Z. *Tetrahedron* **2008**, *64*, 7477-7488.
25. "Cyclic Nitriles: Stereodivergent Addition-Alkylation-Cyclization to *cis*- and *trans*-Abietanes" Fleming, F. F.; Wei, G.; Steward, O. W. *J. Org. Chem.* **2008**, *73*, 3674-3679.
26. "Metalated Nitriles: Internal 1,2-Asymmetric Induction" Fleming, F. F.; Liu, W.; Ghosh, S.; Steward, O. W. *J. Org. Chem.* **2008**, *73*, 2803-2810.
27. "Preparation of Functionalized Alkylmagnesium Derivatives Using an I/Mg-Exchange" Rauhut, C. B.; Vu, V. A.; Fleming, F. F.; Knochel, P. *Org. Lett.* **2008**, *10*, 1187-1189.
28. "Grignard Reagents: Expedient Iodine-Magnesium Exchange at sp^3 Centers" Fleming, F. F.; Gudipati, S.; Vu, V. A.; Mycka, R. J.; Knochel, P. *Org. Lett.* **2007**, *9*, 4507-4509.
29. "Metalated Nitriles: Diastereoselective Internal Asymmetric Induction" Fleming, F. F.; Liu, W.; Ghosh, S.; Steward, O. W. *Angew. Chem., Int. Ed.* **2007**, *46*, 7098-7100.

30. "Alkenenitriles: Conjugate Additions of Alkyl Iodides With a Silica-Supported Zinc-Copper Matrix in Water " Fleming, F. F.; Gudipati, S.; Aitken, J. *J. Org. Chem.* **2007**, *72*, 6961-6969.
31. "Metalated Nitriles: Cation-Controlled Cyclizations" Fleming, F. F.; Wei, Y.; Liu, W.; Zhang, Z. *Org. Lett.* **2007**, *9*, 2733-2736.
32. "Cyclic Oxonitriles: Stereodivergent Grignard Addition-Alkylations" Fleming, F. F.; Wei, G.; Zhang, Z.; Steward, O. W. *J. Org. Chem.* **2007**, *72*, 5270-5275.
33. "Metalated Nitriles: Chelation-Controlled Cyclizations to *cis* and *trans* Hydrindanes and Decalins" Fleming, F. F.; Vu, V. A.; Shook, B. C.; Raman, M.; Steward, O. W. *J. Org. Chem.* **2007**, *72*, 1431-1436.
34. "Oxonitriles: A Grignard Addition-Acylation Route to Enamides" Fleming, F. F.; Wei, G.; Zhang, Z.; Steward, O. W. *Org. Lett.* **2006**, *8*, 4903-4906.
35. "Alkenenitriles: Zn-Cu Promoted Conjugate Additions of Alkyl Iodides in Water" Fleming, F. F.; Gudipati, S. *Org. Lett.* **2006**, *8*, 1557-1559.
36. "C-Metalated Nitriles: Electrophile-Dependent Alkylations and Acylations" Fleming, F. F.; Zhang, Z.; Wei, G.; Steward, O. W. *J. Org. Chem.* **2006**, *71*, 1430-1435.
37. "Preparation of 3-Oxacyclohex-1-ene-1-carbonitrile" Fleming, F. F.; Zhang, Z.; Wei, G. *Synthesis* **2005**, 3179-3180.
38. "Cyclic Nitriles: Diastereoselective Alkylations" Fleming, F. F.; Gudipati, S.; Zhang, Z.; Liu, W.; Steward, O. W. *J. Org. Chem.* **2005**, *70*, 3845-3849.
39. "Metalated Nitriles: Organolithium, -Magnesium, and -Copper Exchange of α -Halonitriles" Fleming, F. F.; Zhang, Z.; Liu, W.; Knochel, P. *J. Org. Chem.* **2005**, *70*, 2200-2205.
40. "Metalated Nitriles: Electrophile-Dependent Alkylations" Fleming, F. F.; Zhang, Z.; Wei, G.; Steward, O. W. *Org. Lett.* **2005**, *7*, 447-449.
41. "Metalated Nitriles: Halogen-Metal Exchange with α -Halonitriles" Fleming, F. F.; Zhang, Z.; Knochel, P. *Org. Lett.* **2004**, *6*, 501-503.
42. "Oxonitriles: Multicomponent Grignard Addition-Alkylations" Fleming, F. F.; Zhang, Z.; Wang, Q.; Steward, O. W. *Angew. Chem., Int. Ed.* **2004**, *43*, 1126-1129.
43. "Cyclic Alkenenitriles: Synthesis, Conjugate Addition, and Stereoselective Annulation" Fleming, F. F.; Zhang, Z.; Wang, Q.; Steward, O. W. *J. Org. Chem.* **2003**, *68*, 7646-7650.
44. "Alkynenitriles: Stereoselective Chelation Controlled Conjugate Addition-Alkylations" Fleming, F. F.; Gudipati, V.; Steward, O. W. *Tetrahedron* **2003**, *59*, 5585-5593.
45. "Hydroxy Alkenenitriles – Diastereoselective Conjugate Addition-Alkylations" Fleming, F. F.; Wang, Q.; Steward, O. W. *J. Org. Chem.* **2003**, *68*, 4235-4238.
46. " ω -Halonitriles: Domino Cyclizations to Oxa- and Carbocyclic Nitriles" Fleming, F. F.; Gudipati, V. Steward, O. W. *J. Org. Chem.* **2003**, *68*, 3943-3946.
47. " β -Siloxy Unsaturated Nitriles: Stereodivergent Cyclizations to *cis*- and *trans*-Decalins" Fleming, F. F.; Shook, B. C.; Jiang, T.; Steward, O. W. *Tetrahedron* **2003**, *59*, 737-745.
48. "Cyclic Alkenenitriles: Chemoselective Oxonitrile Cyclizations" Fleming, F. F.; Funk, L. A.; Altundas, R.; Sharief, V. *J. Org. Chem.* **2002**, *67*, 9414-9416.
49. "Alkenenitriles: Annulations with ω -Chloro Grignard Reagents" Fleming, F. F.; Zhang, Z.; Wang, Q.; Steward, O. W. *Org. Lett.* **2002**, *4*, 2493-2495.
50. " γ -Hydroxy- α,β -alkenenitriles: Chelation-Controlled Conjugate Additions" Fleming, F. F.; Wang, Q.; Zhang, Z.; Steward, O. W. *J. Org. Chem.* **2002**, *67*, 5953-5956.
51. "Unsaturated Nitriles: Stereoselective MgO Eliminations" Fleming, F. F.; Shook, B. C. *J. Org. Chem.* **2002**, *67*, 3668-3672.
52. "Nitrile Anions: Solvent-Dependent Cyclizations" Fleming, F. F.; Shook, B. C. *J. Org. Chem.* **2002**, *67*, 2885-2888.

53. "Alkynenitriles: Chelation-Controlled Conjugate Additions" Fleming, F. F.; Gudipati, V.; Steward, O. W. *Org. Lett.* **2002**, *4*, 659-661.
54. "1-Oxo-2-cyclohexenyl-2-carbonitrile" Fleming, F. F.; Shook, B. C. *Org. Syn.* **2002**, *78*, 254-260.
55. "Crystal Structure of 2-(*tert*butyldimethylsilyloxy)-6-phenyl]-1-cyclohexene-1-carbonitrile, C₁₉H₂₇NOSi" Fleming, F. F.; Pu, Y.; Norman, R. E.; Chang, S. -C. *Z. Kristallogr.* **2001**, *216*, 647-648.
56. "Deprotecting Dithiane-Containing Alkaloids" Fleming, F. F.; Funk, L.; Altundas, R.; Tu, Y. *J. Org. Chem.* **2001**, *66*, 6502-6504.
57. "Hydroxylated α,β -Unsaturated Nitriles: Stereoselective Synthesis " Fleming, F. F.; Wang, Q.; Steward, O. W. *J. Org. Chem.* **2001**, *66*, 2171-2174.
58. " γ -Hydroxy Unsaturated Nitriles: Chelation-Controlled Conjugate Additions" Fleming, F.F.; Wang, Q.; Steward, O.W. *Org. Lett.* **2000**, *2*, 1477-1479.
59. " α,β -Unsaturated Nitriles: Preparative MgO Elimination" Fleming, F. F.; Shook, B. C. *Tetrahedron Lett.* **2000**, *41*, 8847-8851.
60. "Unsaturated Nitriles: Precursors for a Domino Ozonolysis-Aldol Synthesis of Oxonitriles" Fleming, F. F.; Huang, A. Sharief, V.; Pu, Y. *J. Org. Chem.* **1999**, *64*, 2830-2834.
61. " β -Siloxy Unsaturated Nitriles: Stereoselective Cyclizations to *cis*- and *trans*-Decalins" Fleming, F. F.; Shook, B.C.; Jiang, T.; Steward, O.W. *Org. Lett.* **1999**, *1*, 1547-1550.
62. "Unsaturated Oxo-Nitriles: Stereoselective, Chelation-Controlled Conjugate Additions" Fleming, F. F.; Guo, J.; Wang, Q.; Weaver, D. *J. Org. Chem.* **1999**, *64*, 8568-8575.
63. "Unsaturated Nitriles: Optimized Coupling of the Chloroprene Grignard Reagent with ω -Bromonitriles" Fleming, F. F.; Jiang, T. *J. Org. Chem.* **1997**, *62*, 7890-7891.
64. "Unsaturated Nitriles: Conjugate Addition-Silylation with Grignard Reagents" Fleming, F. F.; Pu, Y. Tercek, F. *J. Org. Chem.* **1997**, *62*, 4883-4885.
65. " α,β -Unsaturated Nitriles: A Domino Ozonolysis-Aldol Synthesis of Highly Reactive Oxonitriles" Fleming, F. F.; Huang, A.; Sharief, V.A.; Pu, Y. *J. Org. Chem.* **1997**, *62*, 3036-3037.
66. " α,β -Unsaturated Nitriles: Stereoselective Conjugate Addition Reactions" Fleming, F. F.; Hussain, Z.; Weaver, D.; Norman, R. E. *J. Org. Chem.* **1997**, *62*, 1305-1309.
67. "(8*R*, 8*aS*)-Indolizidine-1-spiro-2'-(1,3-dithiane)-8-carbonitrile" Fleming, F. F.; Hussain, Z.; Mullaney, M.; Norman, R. E. ; Chang, S.-C. *Acta Crystallogr.* **1996**, *C52*, 2849-2851.
68. "Fatty Acid Amide Biosynthesis: A Possible New Role for Peptidylglycine α -Amidating Enzyme and Acyl-CoA:Glycine *N*-Acyltransferase" Merkle, D. J.; Merkle, K. A.; Stern, W.; Fleming, F. F. *Arch. Biochem. Biophys.* **1996**, *330*, 430.
69. "1-Cyanomethyl-6, 7, 8-trioxabicyclo[3.2.1]octane" Zhou, J.-R.; Huang, A.; Fleming, F. F.; Norman, R. E.; Chang, S.-C. *Acta Crystallogr.* **1996**, *C52*, 1012-1014.
70. "3-Cyano-1-[4-(1,3-dithian-2-yl)butyl]-1,4,5,6-tetrahydropyridine" Hussain, Z.; Fleming, F. F.; Norman, R. E.; Chang, S.-C. *Acta Crystallogr.* **1996**, *C52*, 1010-1012.
71. "(9*S*, 9*aR*)-1,3,4,6,7,8,9,9*a*-Octahydro-2*H*-quinolizine-1-spiro-2'-(1,3-dithiane)-9-carbonitrile" Hussain, Z.; Fleming, F. F.; Norman, R. E.; Chang, S.-C. *Acta Crystallogr.* **1996**, *C52*, 1296-1298.
72. " α,β -Unsaturated Nitriles: An Efficient Conjugate-Addition of Potassium Phenyl Selenide", Fleming, F. F.; Pak, J. *J. Org. Chem.* **1995**, *60*, 4299-4301.
73. "Improved Labelling Methods For C9-²H-Retronecine", Hovermale, J. T.; Fleming, F. F.; White, J. D.; Craig M. *Heterocycles* **1994**, *38*, 135-142.
74. "Palladium (0)-catalyzed conversion of vinyl trifluoromethane-sulfonates into α,β -unsaturated nitriles", Piers, E.; Fleming, F. F. *Can. J. Chem.* **1993**, *71*, 1867-1872.

75. "Tin (IV)-catalyzed Lactonization of ω -Hydroxy Trifluoroethyl Esters", White, J. D.; Green, N. J.; Fleming, F. F. *Tetrahedron Lett.* **1993**, *34*, 3515-3518.
76. "Bifunctional conjunctive reagents: 5-chloro-2-lithio-1-pentene and related substances. A methylenecyclohexane annulation method" Piers, E.; Yeung, B. W. A., Fleming, F. F. *Can. J. Chem.* **1993**, *71*, 280-286.
77. "Conversion of Enol Trifluoromethanesulphonates into α,β -Unsaturated Nitriles" Piers, E.; Fleming, F. F. *J. C. S. Chem. Commun.* **1989**, 756-757.
78. "Total Synthesis of the *trans*-Clerodane Diterpenoid (\pm) Stephalic Acid" Piers, E.; Fleming, F. F. *J. C. S. Chem. Commun.* **1989**, 1665-1667.

2. Review Articles

1. "Catalytic Isonitrile Insertions and Condensations Initiated by RNC – X Complexation" Chakrabarty, S, Choudhary, S.; Doshi, A.; Liu, F.-Q.; Mohan, R. Ravindra, M. P.; Shah, D. Yang, X.; Fleming, F. F. *Adv. Synth. Cat.* **2014**, *356*, 2135-2196. ([PMC4251577](#))
2. " S_Ni Displacements With Main Group Organometallics" Devambatla, R. K. V.; Velagaleti, R.; Yarravarapu, N.; Fleming, F. F. *Tetrahedron* **2012**, *68*, 2925-2942.
3. "Nitrile-Containing Pharmaceuticals: Efficacious Roles of the Nitrile Pharmacophore" Fleming, F. F.; Yao, L.; Ravikumar, P. C.; Funk, L.; Shook, B. C. *J. Med. Chem.* **2010**, *53*, 7902-7917.
4. "Cyclic Metalated Nitriles: Stereoselective Cyclizations to *cis*- and *trans*-Hydrindanes, Decalins, and Bicyclo[4.3.0]undecanes" Fleming, F. F.; Gudipati, S. *Eur. J. Org. Chem.* **2008**, 5365-5374.
5. "Cyclic Oxonitriles: Synergistic Juxtaposition of Ketone and Nitrile Functionalities" Fleming, F. F.; Iyer, P. S. *Synthesis* **2006**, 893-913.
6. "Cyclic Nitriles: Tactical Advantages in Synthesis" Fleming, F. F.; Zhang, Z. *Tetrahedron* **2005**, *61*, 747-789.
7. "Unsaturated Nitriles: Conjugate Additions of Carbon Nucleophiles to A Recalcitrant Class of Acceptors " Fleming, F. F.; Wang, Q. *Chem. Rev.* **2003**, *103*, 2035-2078.
8. "Nitrile Anion Cyclizations" Fleming, F. F.; Shook, B. C. *Tetrahedron* **2002**, *58*, 1-23.
9. "Nitrile-Containing Natural Products" Fleming, F. F. *Nat. Prod. Rep.* **1999**, *16*, 597-606.

B. Patents

1. "Composition, Synthesis, and Use of Isonitriles" Fleming, F. F. *Provisional Patent Application # 61/942,843*, 02/21/2014.
2. "Composition, Synthesis, and Use of Isonitriles" Fleming, F. F. *US Patent #8,269,032* issued 09/18/2012.

C. Grants Awarded - PI

1. "Developing Isonitrile Chemistry for Medicinal Applications" \$463,200. 08/01/2012 - 07/31/2015. National Institutes of Health (2R15AI051352-04).
2. "Nitrile Anions: Unmasking Fundamental Reactivity" \$402,000. 09/01/2011 - 08/31/15. National Science Foundation (1111406).
3. "Nitrile Anions: Unmasking Fundamental Reactivity" \$26,500. 09/01/2008. National Science Foundation – Supplement (0904393)
4. "Nitrile Anions: Unmasking Fundamental Reactivity" \$360,000. 2008 - 2011. National Science Foundation (0808996).

5. "Nitrile-Containing Decalins in Medicine" \$223,530. 2008 - 2011 (3/31/2008 2R15AI051352-03). National Institutes of Health.
6. "Acquisition of an Upgrade for a 500 MHz NMR Spectrometer" \$383,765. 2005 - 2008. National Science Foundation (0614785).
7. "Nitrile Anions: Unmasking Fundamental Reactivity" \$387,000. 2005 - 2008. National Science Foundation (0515715).
8. "Nitrile-Containing Decalins in Medicine" \$225,840. 2005 - 2008. National Institutes of Health.
9. "Invigorating the Chemistry of Nitriles: A Sabbatical Exploration of Functionalized Grignard Reagents " \$19,100 for 5 months beginning 1 Jan. 2003. National Science Foundation (0203145).
10. "Enhancing The Chemistry of Nitriles: A Sabbatical Discovery" \$8,500 for 6 months beginning 1 Jan. 2003. Christian Scholars Foundation.
11. "Nitrile Anions: Unmasking Fundamental Reactivity" \$265,000. 2002 - 2005. National Science Foundation (0210955).
12. "Nitrile-Containing Decalins in Medicine" \$143,438. 2002 - 2005. National Institutes of Health.
13. "Nitrile Anion Cyclizations" \$5,000. Presidential Scholarship Award, 2001.
14. "Nitrile-Based Syntheses of Anticancer Matrine Alkaloids" from Johnson & Johnson Focused Giving Program, \$90,000. 1997 - 1999.
15. "Cyanoketone-Based Syntheses of Anti-HIV Marasmanes" from NIH, \$113,478. 1996 - 1999.
16. "Alkanenitrile-Butadienes: The Synthesis and Reactivity of New Rubber Monomers" from Bayer Rubber Inc., \$7,000. 1996.
17. "The Synthesis of α -Cyanocycloalkenones as Therapeutic Agents" Dreaded Diseases Grant (DU), \$8,531. 1993.
18. "Intramolecular Dithiane Anion Additions to Unsaturated Nitriles" "Faculty Development Fund" \$5,000. 1992.

D. Grants Awarded – Co-PI

1. "Upgrade of the Research/Teaching X-ray Diffractometer at Duquesne University" \$180,000. 2003 - 2005. National Science Foundation.

E. Scholarly Presentations (>120)

National and international presentations to audiences in the US, Germany, Scotland, Austria, Poland, Sweden, Italy, France, Turkey, and New Zealand. An itemized list is available on request.

F. Honors and Awards

- | | | |
|----|---|-------------|
| 1. | President's Award for Excellence in Scholarship | 2010 |
| 2. | Bayer School Award for Excellence in Scholarship | 2010 |
| 3. | Bayer School Award for Excellence in Scholarship | 1999 |
| 4. | Hunkele Creative Teaching Award | 1995 |
| 5. | Izaak Walton Killam Predoctoral Fellowship (Canada) | 1988 - 1990 |
| 6. | Shirtcliffe Scholarship (New Zealand) | 1986 - 1989 |
| 7. | Izaak Walton Killam Predoctoral Fellowship (Canada) | 1986 - 1988 |
| 8. | Massey Scholar (New Zealand) | 1985 |

G. Collaborators

1. Paul Knochel, Ludwig Maximilians University, Munich, Germany – Chemistry of Grignards.

2. Göran Hilmersson, Göteborg University, Göteborg, Sweden – NMR analysis of metalated nitriles.
3. Ramazan Altundas, Ataturk University, Erzurum, Turkey – Chemistry of Oxonitriles.
4. Omar W. Steward, Duquesne University – X-ray structure elucidation of nitriles.
5. Jeffrey Evanseck, Duquesne University – Modeling stereoelectronic reactions of metalated nitriles.
6. Iain Coldham, University of Sheffield, England – Stereoselective alkylations of metalated nitriles.

H. Non-peer Reviewed Publications

1. Invited editorial for IVCF Faculty Newsletter "The God of Scholarship" (2000)
2. Invited editorial for IVCF Faculty Newsletter "The Evangelical Mind on Campus: Contextualized, Compartmentalized, or Christian?" (1998)

V. SERVICE

A. University and School Service

1. Led a book study on "The Probability of God" for the University Honors College (Summer 2006).
2. Hosted CAFÉ and university speaker Dr. Terence Nichols (2006, Organizer).
3. Hosted CAFÉ and university speaker Dr. Fritz Schaefer (2005, Organizer).
4. Hosted CAFÉ and university speaker Dr. James Sire (2001, Organizer).
5. Co-presented a time management workshop "Too Busy for Lunch" sponsored by the Center for Teaching Excellence (Fall 2000).
6. Hosted CAFÉ and university speaker Dr. Gary Ferngren (2000, Organizer).
7. Hunkele Creative Teaching Award Committee (1995 -1997, Member).
8. Mellon Hall Safety Committee (1993 - 1994, Member).
9. Freshman Development Mentor for 18 students (1993 - 1994).

B. Departmental Service

1. Ethics Committee (2011 - present)
2. Technical Faculty Search (2004, Chair).
3. Seminar Committee (2003 - present, Chair).
4. Space Committee Chair (1999 - 2004, Chair).
5. Graduate Student Recruitment Committee (1999 - 2002, Member).
6. Graduate Studies Committee (1996 - 1998, Member).
7. Seminar Committee (1995 - 1999)
8. Retreat Committee (1995 - 1996, Chair).
9. Departmental Chemical Safety Committee (1992 - 1994, Member).
10. Organized annual field trips to local chemical industries for students majoring in chemistry and the departmental "Student Affiliate Chapter of the American Chemical Society":
 - a. Pressure Chemical Inc. site visit (PA 1997)
 - b. Drake Oil Well Museum and Pennzoil refinery and research labs (PA, 1996).
 - c. Lord adhesives formulation followed by a tour of Hammermill paper (PA, 1995).
 - d. Calgon research labs and manufacturing plant (PA, 1994).
 - e. Miles isocyanate manufacturing plant and environmental remediation (WV, 1993).
 - f. American Chemical Society's "Chemical Career Insights" in Gettysburg (PA, 1993).

C. Community Service

1. Vestry Member of Church of the Savior (2007 - 2009, 2011 - 2012)

2. Guest sermon "Following Jesus With All My Soul," All Saints Anglican Church, Wellington, New Zealand, July 1, 2012.
3. Panelist for a presentation "Science and Religion Face Off," Point Park University, March 19, 2012.
4. Mission and Identity and CAFÉ Sponsored Presentation "Being a Great Faculty Member: More than the faculty handbook and yearly evaluations!" Spring 2011.
5. Presentation to Crossroads Fellowship "Here I am Lord, send me," November 18, 2009, Duquesne University.
6. Participated in a panel discussion: "Reconciling Apparent Conflicts Between Science and Scripture," sponsored by CAFÉ, Duquesne University Mission and Identity, and Crossroads; March 10, 2009.
7. Presented a seminar "Integrating Christianity and Scholarship" on June 21, 2006 to Campus fur Christ and SMD at Evangelish-Freikirchliche Gemeinde, Munich, Germany.
8. Presented a seminar "Challenges Facing Christian Professors" to "Christian Initiative of Professors – CHIPS" on May 15, 2006 at CVJM-Haus, Munich, Germany.
9. Gave two short presentations "Ministering Together" and "Ministering Individually" at "Tagung des Professorenforums Deutschland" on May 13, 2006, as part of a day-long conference for the Professoren Forum, Munich, Germany.
10. Presented a seminar "Integrating Christianity and Scholarship" on April 6, 2006, at Jugend mit einer Mission (YWAM) Hurlach, Germany.
11. Taught a 6-week series "Integrating Science and Christianity" at The Church of the Ascension. (Spring 2006).
12. Taught an 8-week series "Living in God's Kingdom Now" at Church of the Epiphany, Avalon. (Fall 2002).
13. Taught a 4-week series "Habits of the Mind" at Church of the Epiphany, Avalon. (Fall 2001).
14. Taught a 4-week series "Living Like Jesus" at Church of the Epiphany, Avalon. (Summer 2000).
15. Taught a 4-week series "Be Thou My Vision" at Church of the Epiphany, Avalon. (Fall 2000).
16. Science Fair Judge for 'Rhema Christian School' (1999-2000)
17. Taught two classes in a series "Christianity in the Marketplace" at St. Stephen's Church, Sewickley (Fall 1996 and Spring 1997).
18. Science experiments with elementary school children at Rhema Christian School:
 - a. Polymer profile (Spring 1997)
 - b. Cooking with Gas: Carbonate Chemistry (Fall 1996)
 - c. T-shirt chromatography. (Spring 1996)
 - d. Acids and bases - exploring acidity with "purple-cabbage indicator." (Fall 1995)
 - e. Making paper. (Spring 1995)
 - f. Hot and cold experiments and "making" ice cream. (Fall 1994)
19. Taught a 6-week series "Science and Christianity: Harmony or Heresy" at St. Stephen's Church, Sewickley. (Fall 1995).

D. Professional Service

1. Conference Chairman, Anantolian Chemistry Conference, March 16-19, Antalya, Turkey.
2. NSF Program Director, August 2013 – August 2015.
3. NSF Synthesis Panel 24-25, October 2011.
4. Session Chair for *Carbanion Symposium*, PacifiChem, Hawaii, December 2010.
5. Session Chair for *9th International Symposium on Carbanion Chemistry*, Florence, Italy, July, 2010.

6. NSF Reviewer for RUI proposal February 2010.
7. Reviewer for Research Corporation January 2010.
8. NIH "Internet Assisted Review" RC-1, RFA-09-003, July 21 2009.
9. NSF Synthesis S Panel 14-15 October 2008.
10. NSF MRI Panel 5-6 May 2008.
11. Reviewer for the *Journal of Organic Chemistry*.
12. Reviewer for *Organic Letters*.
13. Reviewer for the *Journal of the American Chemical Society*.
14. Reviewer for *Angewandte Chemie*.
15. Reviewer for *Organic & Biomolecular Chemistry*.
16. Reviewer for the *Synlett*.
17. Reviewer for *Molecules*.
18. Reviewer for *Tetrahedron*.
19. Reviewer for *Tetrahedron Letters*.
20. Grants reviewed for *American Chemical Society Petroleum Research Fund*.
21. Grants reviewed for *National Institutes of Health*.
22. Grants reviewed for *National Science Foundation*.
23. Grants reviewed for *Natural Science and Engineering Research Council (Canada)*.
24. Discussion leader for *Gordon Research Conference on "Organic Reactions and Processes"*, Roger Williams University, RI, July 18-23, 2004.
25. Discussion leader for *Gordon Research Conference on "Organic Reactions and Processes"*, Roger Williams University, RI, July 20-25, 2003.
26. Presided over the "Natural Products" session for the "American Chemical Society Central Regional Meeting," Sheraton Station Square, Pittsburgh, 5 Oct. 1993.