

VITAE

Name: Robert J. Fleming

Address: Trinity College
Department of Biology
238 Life Science Center
Hartford, CT 06106
Phone 860-297-4192

EDUCATION:

- 1987-1991 Yale University
Biology Department
New Haven, CT 06536
Post doctoral Advisor : Dr. Spyros Artavanis-Tsakonas
- 1980-1987 Brandeis University
Graduate School of Arts and Sciences
Biology Department
Waltham, MA 02254
Major: Developmental Biology Minor: Genetics
Degree Earned: Ph. D.
- 1976-1980 College of the Holy Cross
Worcester, MA
Major: Biological Sciences Degree Earned: B. A.

RESEARCH EXPERIENCE:

- July 2012 – present **Professor** Trinity College
- July 2001-June 2012 **Associate Professor** Trinity College
Tenure granted July 2004
- 1998 - June 2001 **Associate Professor** University of Rochester
- 1992 – 1998 **Assistant Professor** University of Rochester
- 1987-1991 **Postdoctoral Research Project**
Yale University - Howard Hughes Medical Institute
Postdoctoral Advisor: Dr. Spyros Artavanis-Tsakonas
Project Title: Molecular Interactions of *Drosophila* Neurogenic Loci.

1981-1987 **Ph. D. Research**
 Brandeis University
 Graduate Advisor: Dr. Kalpana White
 Thesis Title: A Molecular-Genetic Characterization
 of the *erect wing* locus in *Drosophila melanogaster*.

HONORS AND FELLOWSHIPS

1990 - 1992 Associate with Howard Hughes Medical Institute
 1987 - 1990 NIH Postdoctoral Fellowship
 1987 Anna Fuller Postdoctoral Fellowship
 1981-1984 NIH Predoctoral Fellowship

PROFESSIONAL SOCIETIES:

1981- Present Genetics Society of America

AREAS OF CURRENT RESEARCH INTEREST

Cell-to-Cell communication, cell surface receptor-mediated signal transduction, ligand-receptor interactions, Nuclear transport and import, Cellular differentiation mechanisms, transcriptional regulation of receptor-ligand feedback interactions.

PROFESSIONAL ACTIVITIES

Ad hoc editorial boards (manuscript reviews): Cell, Biotechniques, Development, Developmental Genetics, Genetics Research, Genesis, Developmental Dynamics, Experimental Cell Research, PNAS

Grant Reviewer for NSF, USDA and the British Columbia Health Research Foundation.

NSF panel review committee on Developmental Mechanisms,
 Washington, D.C. Fall 2005

NSF panel review committee on Developmental Mechanisms,
 Washington, D.C. Spring 2017

SEMINARS/PRESENTATIONS (partial list)

2013 Invited Speaker: Oct. 6-11, 2014
 The Notch Meeting VII
 Athens, Greece

2011 Invited Speaker: Oct. 2-6, 2011
 The Notch Meeting V
 Athens, Greece

- 2009 Siena College October 2009
Mt Holyoke College December 2009
- 2008 Harvard University May 2008
Department of Cell Biology
- 2008 2008 Darwin Festival Speaker February 12, 2008.
Salem State College
- 2000 Invited speaker: Jan. 26-29, 2000
VIIth DBMS/IBS Workshop
“From the structure and function to the design of modular proteins”
Autrans France

COMMITTEES

Trinity College

- 2013-16, 2019-21 A&P committee
2012-2020 Chair, Institutional Biosafety Committee (IBC)
2012 Academic Affairs Committee
2007-2008 Admissions and Financial Aid Committee
Curriculum Committee
Faculty Research Committee
Howard Hughes Steering Committee
- 2006-2007 Curriculum Committee
Chair, Faculty Research Committee
Howard Hughes Steering Committee
- 2004-2005 Faculty Research Committee
2003 Faculty Research Committee
Academic Affairs Committee
Summer Task force on Distribution Requirements
Summer Task force on Enhanced Science Requirement
- 2002 Library Committee

TEACHING EXPERIENCE

Trinity College:

Lecture Courses:

- | | | |
|-----------|---------------------|------------------------------------|
| 2001–2021 | Biol 310 | Developmental Biology (J-term) |
| | Biol 183 | Cellular Basis of Life |
| | Biol 224 (Biol 221) | Genetics |
| | Biol 182 (Biol 152) | Section on genetics |
| | Biol 310L | Developmental Biology |
| | Biol 464 | Senior Seminar - Molecular Biology |
| | Biol 175 | Genome Analysis |
| | FYSM 170 | Phage Hunter |

Biol 120 Genes; Clones & Biotechnology

Laboratory Courses:

2001–2011

Bio 220L Genetics laboratory
Bio 310 Developmental Biology Lab

Seminars:

2003

FYSM107 “The Thread of Life” First Year Seminar

2018

FYSM195 “The Biology of Science Fiction”

RESEARCH STUDENTS SUPERVISED**Undergraduate at Trinity:**

<u>Name</u>	<u>Placement in Lab</u>	<u>Year(s)</u>
Nuala Peterman	Research Student	Summer 2021
Katrina Angelucci	Research Student	Spring 2020
Shelden Taylor	Research Student	Fall 2020
Junyao Yuan	Research Student	Spring 2018, Fall 2020, Spring 2021
Duuluu Naranbat	Research Student	Summer 2018 – Fall 2018, Spring 2019
Zimo Huang	Research Student	Summer 2018 – Fall 2018, Spring 2019, Fall 2020
Tyler Seckar	Research Student	Summer 2017
Fabiola Yun	Research Student	Summer 2016, 2017
Scott Buchanan	Research Student	Fall 14, Sp & Summer 15, Fall 2015, Spring 2016, Summer 2016, Fall 2016, Spring 2017
Kathy Rodogiannis	Research Student	Summer ‘14, Sp & Smr ’15
Anne Do	Research Student	Spring 2014
Tayoot Chengsupanimit	Research Student	Spring 2013
William Blaine	Research Student	Summer 2012
James Curlin	Research Student	Summer 2012/2013/Fall 2013/Spring/Summer 2014
Christine Reavis	ISP Research Student	Spring 2012
Geoffrey Kwok	Research student	Summer 2011
Connor McElligott	First year research student	Spring /Summer/Fall 2011
Ayiti Maharaj-Best	ISP Research student	Spring & summer 2010
Lam Hoang	ISP student	Summer 2009
Gina Filloramo	Research/Senior Thesis	2009 Summer/Fall & 2010 Spring
Kaiwan Raza	ISP Research student	2008 Spring/Summer

Gina Filloramo	Research student	2008 Summer-2009 Summer
Jillian Langer	Research Student	2007 Summer, Fall 2008 Spring
Brian Lee	Research Student	2006 Summer/Fall
Rumen Vasilev	Research Student	2006 Summer
Rachel Reese	Research Student	2006 Summer
Olubunmi Adeosun	Research Student	2005 Summer
David Frederick	Research Student	2005 Summer/Fall & 2006 Spring
Fatema Mosammat	Research Student	2004 Summer
Peter Bittenbender	Senior Thesis	2002-2003 fall & spring
Baognoc Pham	ISP student	2003 spring & summer
Ravin Ratan	Research student/Senior Thesis	2003/2004 summer
Amanda Jones	Student volunteer	2002-2003 academic years
Jessica Mosher	Senior Thesis	2001 -2002 fall & spring
Kari Bjornard	ISP student	2002 spring and summer
Isaac Goldstein	ISP student	2002 spring

RESEARCH SUPPORT

Previous:

“RUI: Characterization of Notch cis-inhibitory sequences in the Serrate Ligand of *Drosophila melanogaster*.” National Science Foundation. \$316,665. Sept. 2011-Aug. 2015.

“RUI: Gene-specific Importin alpha functions in Development” National Science Foundation. 1/1/03 through 12/31/06 Total: \$187,927.

“RUI: Gene-specific Importin alpha functions in Development” National Science Foundation supplemental funding for summer students. Runs 5/1/06 to 8/31/06 Total: \$5,643.

“RUI: Gene-specific Importin alpha functions in Development” National Science Foundation supplemental funding for summer students. Runs 5/1/05 to 8/31/05 Total: \$11,486.

“RUI: Gene-specific Importin alpha functions in Development” National Science Foundation supplemental funding for summer students. Runs 5/1/04 to 8/31/04 Total: \$11,486.

“RUI: Gene-specific Importin alpha functions in Development” National Science Foundation supplemental funding for summer students. Runs 5/1/03 to 8/31/03 Total: \$10,159.

Contributing author to the Howard Hughes Medical Institute Grant to Trinity College. 2003.

“The importin- α gene family in *Drosophila melanogaster*.” Co-PI with Dr. David Goldfarb at U. Rochester. March of Dimes grant. 2001-2003

“Neurogenic interactions and intercellular signaling” National Science Foundation Jan. 1, 1995 - Dec. 30, 1997. \$ 336,301

"Functional signaling domains of *Notch* ligands". National Science Foundation
Jan. 1, 1998 - Dec. 30, 2000 \$ 351,063.

Internal Funding:

FRC one-year support: "Mechanisms Governing Activation and Cis-Inhibition of the Notch Receptor by the Serrate Ligand in *Drosophila melanogaster*." June 2010-May 2011 - \$3000.00.

FRC one-year support: "Regions of the Notch ligand, Serrate, that mediate cis inhibition and transactivation in *Drosophila melanogaster*." June 2011-May 2012 - \$4000.00.

Summer Student Support: (after NSF funding from 01/03/03 – 08/31/06):

Jillian M. Langer:	HHMI Institutional grant support – summer 2007
Gina Filloramo:	Trinity FRC summer support – summer 2008, summer 2009
Ayiti Maharaj-Best	Trinity FRC summer support – summer 2010
Connor McElligott	Trinity FRC summer support – summer 2011
Geoffrey Kwok	Trinity FRC summer support – summer 2011

PATENTS

"Nucleotides and Protein Sequences of the Serrate Gene and Methods Based Thereon"
U. S. Patent 5,869,282 Granted 2/9/99.

PUBLICATIONS

Book Chapter:

Fleming, Robert J. 2020. "Ligand-induced cis-inhibition of Notch signaling: the role of an extracellular region of Serrate". In *Notch signaling in Embryology and Cancer* (2nd edition). Reichrath and Reichrath eds. Springer Nature, Switzerland.

Articles:

Fleming, Robert J., Hori, Kazuya, Sen, Anindya, Filloramo, Gina V., Langer, Jillian M., Obar, Robert A., Artavanis-Tsakonas, Spyros and Maharaj-Best, Ayiti C. 2013. An extracellular region of Serrate is essential for ligand-induced cis-inhibition of Notch signaling. *Development* **140**: 2039-2049.

Fleming, R. J. Notch signaling. In "McGraw-Hill 2012 Yearbook of Science and Technology" Mark D. Licker, Publisher. McGraw Hill Publishers. Dec. 2011.

Ratan, R., Mason, D.A., Sinnot, B., Goldfarb, D.S. and Fleming, R. J. 2008. *Drosophila* importin $\alpha 1$ performs paralog-specific functions essential for gametogenesis. *Genetics* **178**: 839-850.

Trang, T.T., Tannous, V., Gu, Y., Mosher, J. and Fleming, R. J. 2004. *Ser^{+r83k}* is a second site mutation of *Ser^D* affecting the N-terminus of Serrate. *Genesis* **39**: 42-51.

Yan, S-J., Gu, Y., Li, W.X., and Fleming, R.J. 2004. Multiple signaling pathways and a selector protein sequentially regulate *Drosophila* wing development. *Development* **131**: 285-298.

Mason, D. A., Máthé, E., Fleming, R. J. and Goldfarb, D. S. 2003. The *Drosophila melanogaster importin α 3* locus encodes an essential gene required for the development of both larval and adult tissues. *Genetics* **165**: 1943-1958.

Mason, D. A., Fleming, R. J. and Goldfarb, D. S. 2002. *Drosophila melanogaster* Importin α 1 and α 3 can replace importin α 2 during spermatogenesis but not oogenesis. *Genetics* **161**: 157-170.

Fleming, R. J. 2000. Notch signaling. In "McGraw-Hill 2001 Yearbook of Science and Technology" Mark D. Licker, Publisher. McGraw Hill Publishers. pp. 276-278.

Fleming, R. J. Structural conservation of Notch receptors and ligands. 1998. *Semin Cell Dev Biol.* **9**: 599-607.

Fleming, R. J., Purcell, K. J. and Artavanis-Tsakonas, S. 1997. The Notch receptor and its ligands. *Trends Cell Biol.* **7**: 437-441.

Hukriede, N. A., Gu, Y. and Fleming, R. J. 1997. A dominant-negative form of *Serrate* acts as a general antagonist of *Notch* activation. *Development* **124**: 3427-3437.

Fleming, R. J., Gu, Y. and Hukriede, N. A. 1997. *Serrate*-mediated activation of *Notch* is specifically blocked by the product of the gene *fringe* in the dorsal compartment of the *Drosophila* wing imaginal disc. *Development* **124**: 2973-2981.

Hukriede, N. A. and Fleming, R. J. 1997. *Beaded of Goldschmidt*, an antimorphic allele of *Serrate*, encodes a protein lacking transmembrane and intracellular domains. *Genetics* **145**:359-374.

Gu, Y., Hukriede, N. A. and Fleming, R. J. 1995 *Serrate* expression can functionally replace *Delta* activity during neuroblast segregation in the *Drosophila* embryo. *Development* **121**: 855-865.

Rebay, I., Fleming, R. J., Fehon, R. G., Cherbas, L., Cherbas, P. and Artavanis-Tsakonas, S. 1991. Specific EGF repeats of *Notch* mediate interactions with *Delta* and *Serrate*: Implications for *Notch* as a multifunctional receptor. *Cell* **67**: 687-699.

Fleming, R. J., Scottgale, T. N., Diederich, R. J. and Artavanis-Tsakonas, S. 1990. The gene *Serrate* encodes a putative EGF-like transmembrane protein essential for proper ectodermal development in *Drosophila melanogaster*. *Genes Dev.* **4**: 2188-2201.

Xu, T., Rebay, I., Fleming, R. J., Scottgale, T. N. and Artavanis-Tsakonas, S. 1990. The *Notch* locus and the genetic circuitry involved in early *Drosophila* neurogenesis. *Genes Dev.* **4**: 464-475.

Fleming, R. J., DeSimone, S. M., and White, K. 1989. Molecular isolation and analysis of the *erect wing* locus in *Drosophila melanogaster*. *Mol. Cell. Biol.* **9**: 719-725.

Fleming, R. J. 1987. A molecular- genetic characterization of the *erect wing* locus in *Drosophila melanogaster*. Ph. D. Thesis. Brandeis University. Waltham, MA.

Fleming, R. J., Zusman, S. B., and White, K. 1983. Developmental genetic analysis of lethal alleles at the *ewg* locus and their effects on muscle development in *Drosophila melanogaster*. *Dev. Genetics* **3**: 347-363.

Fleming, R. J. 1982. A quick method for visualizing the internal structures of *Drosophila* larvae. *DIS* **58**: 155.

ABSTRACTS / POSTERS (external only - partial list)

- 2014 Gordon Research Conference: Notch Signaling in Development, Regeneration & Disease
 Activation of Notch Requires Extracellular Juxtamembrane Sequences of the Serrate Ligand. R. J. Fleming, K. Hori, S. Artavanis-Tsakonas and C. McElligott.
 Development of Gene Constructs to Test the Function of the Notch Inhibitory Region Within the Serrate Ligand.
 J. Curlin and R. J. Fleming.
- 2011 52nd Annual Drosophila Research Conference @ San Diego, CA
 Specific Extracellular EGF-like repeats within Serrate form a Notch Inhibitory Region. R. J. Fleming, K. Hori, A. Sen, R. Obar, S. Artavanis-Tsakonas and G. Filloramo.
- 2005 46th Annual Drosophila Research Conference @ San Diego, CA
 Characterization of deletions removing the *importin $\alpha 1$* locus of *Drosophila melanogaster*. R. J. Fleming, R. Ratan, D. Adam Mason and D. Goldfarb.
- 1998 39th Annual Drosophila Research Conference @ Washington, D. C.
 Molecular complementation and the requirement of a C-terminal valine demonstrate cooperative interactions amongst *Serrate*

molecules during *Notch* signaling. N. A. Hukriede, C. M. Wright and R. J. Fleming.

1996

37th Annual Drosophila Research Conference @ San Diego

Analysis of a SERRATE functional domain during wing development. Y. Gu and R. J. Fleming.

Beaded of Goldschmidt, an allele of the *Serrate* locus capable of antagonizing wild type function. N. A. Hukriede and R. J. Fleming.

1995

36th Annual Drosophila Research Conference @ Atlanta

A functional test of the sea urchin astacin protease SpAN in *Drosophila* embryos. D. J. Kozłowski, N. A. Hukriede, L. M. Angerer, R. C. Angerer & R. J. Fleming.

Clonal analysis with loss-of-function alleles demonstrates a non-autonomous role for the *Serrate* gene. N. A. Hukriede & R. J. Fleming.