

James William Smyth, PhD

Assistant Professor, Virginia Tech Carilion Research Institute
Assistant Professor, Center for Heart and Regenerative Medicine Research, Virginia Tech Carilion Research Institute
Assistant Professor, Department of Biological Sciences, Virginia Tech
Assistant Professor, Department of Biomedical Sciences, Virginia Tech Carilion School of Medicine

1. EDUCATION AND PROFESSIONAL HISTORY:

EDUCATION:

1994-1998 B.Sc. (Honors), Industrial Microbiology University College Dublin, Ireland

1999-2005 Ph.D., Virology Trinity College Dublin, Ireland

Thesis Topic: *'Inhibition of K-BALB murine tumours using Semliki Forest Virus and its derived vector'*

PROFESSIONAL SUMMARY:

Primary Research Focus: *Cardiovascular Disease Processes*

Areas of expertise and interest: *Intercellular communication, gap junctions, protein translation, ion channel trafficking, cytoskeleton, cardiomyocyte cell biology, ischemia, adenovirus, viral myocarditis*

TRAINING

ACADEMIC APPOINTMENTS:

July 2005-July2010	Postdoctoral Fellow, University of California San Francisco
July 2010-July2013	Specialist, University of California San Francisco
July 2013-July2014	Project Scientist, Cedars-Sinai Medical Center
July 2014-current	Assistant Professor, Virginia Tech Carilion Research Institute
July 2014-current	Assistant Professor of Biological Sciences, Virginia Tech
July 2014-current	Assistant Professor, Center for Heart and Regenerative Medicine Research, Virginia Tech Carilion Research Institute
Dec 2015-current	Assistant Professor, Department of Biomedical Sciences, Virginia Tech Carilion School of Medicine

2. HONORS, AND AWARDS:

2013 2nd Prize Trainee Oral Presentation Award

International Gap Junction Conference, Charleston, South Carolina

2013 Travel Award and Highly Commended Poster Presentation

Gordon Research Conference on Cardiac Arrhythmia Mechanisms, Ventura, California

3. ADVISING AND MENTORING:

Postdoctoral fellows mentored:

Michael J, Zeitz, Ph.D. Research Scientist at VTCRI (2014-current)

Students advised:

Carissa James, Ph.D. graduate student, Translational Biology, Medicine, and Health program, VT (2015-current)

Allen Vu Phan, medical student, VTCSOM (2014-current)

Jaspreet Hira, medical student, VTSOM (2015-current)

Proma Ahmed, undergraduate, Biological Sciences, VT (2016-current)

Patrick Calhoun, undergraduate, Microbiology Major, VT (2015-current)

Lindsay Bolles, undergraduate, VWCC (2014-2015)

Timothy Reinaldo, undergraduate, Biological Sciences, VT (2015)

Thesis Committees:

Michael Entz, Ph.D. graduate student (2014-current). Department of Biomedical Engineering and Mechanics, VT. Advisor – Dr. Steven Poelzing

Courtney Long, Ph.D. graduate student (2015-current). Translational Biology, Medicine, and Health program, VT. Advisor – Dr. Sarah McDonald

Tristan Raisch, Ph.D. graduate student (2015-current). Translational Biology, Medicine, and Health program, VT. Advisor – Dr. Steven Poelzing

4. SCIENTIFIC AND SCHOLARLY ACTIVITIES

Papers (Peer reviewed):

1. Atkins GJ, **Smyth JW**, Fleeton MN, Galbraith SE, Sheahan BJ. Alphaviruses and their derived vectors as anti-tumor agents. *Current Cancer Drug Targets*. 2004 Nov;4(7):597-607. PMID: 15578917
2. **Smyth JW**, Fleeton MN, Sheahan BJ and Atkins GJ. Treatment of rapidly growing K-BALB and CT26 mouse tumors using Semliki Forest virus and its derived vector. *Gene Therapy*. 2005 Jan;12(2):147-59. PMID: 15372069
3. Saxena A, Fish JE, White MD, Yu S, **Smyth JW**, Shaw RM, DiMaio JM, and Srivastava D. Stromal cell-derived factor-1 α is cardioprotective after myocardial infarction. *Circulation*. 2008;117:2224-2231. PMCID: PMC2743260
4. **Smyth JW** and Shaw RM. Visualizing ion channel dynamics at the plasma membrane. *Heart Rhythm*. 2008 Jun;5, S7-11. PMCID: PMC2474660
5. **Smyth JW**, Hong TTH, Gao D, Vogan J, Jensen B, Fong T, Simpson P, Stainier D, Chi N, Shaw RM. Limited forward trafficking of connexin 43 reduces cell-cell coupling in stressed human and mouse myocardium. *The Journal of Clinical Investigation*. 2010 Jan;120(1):266-79. PMCID: PMC2798685 commentary in: *The Journal of Clinical Investigation*. 2010 Jan;120(1): 87-89.
6. Hong TTH, **Smyth JW**, Gao D, Chu K, Vogan JM, Fong TS, Jensen BC, Colecraft HM, Shaw RM. BIN1 Localizes the L-Type Calcium Channel to Cardiac T-Tubules. *PLoS Biology*. 2010 Feb 16;8(2). PMCID: PMC2821894 commentary in: *PLoS Biology*. 2010 Feb: 16;8(2)
7. **Smyth JW** and Shaw RM. Forward trafficking of ion channels: what the clinician needs to know. *Heart Rhythm*. 2010 Aug;7(8): 1135-40. PMCID: PMC2821894
8. Nordstrom SM, Holliday BA, Sos BC, **Smyth JW**, Levy RE, Dukes JW, Lord ST, Weiss EJ. Increased thrombosis susceptibility and altered fibrin formation in STAT5-deficient mice. *Blood*. 2010 Dec;116(25):5724-33. PMCID: PMC3031416
9. Zhang SS*, Kim KH*, Rosen A*, **Smyth JW***, Sakuma R*, Delgado-Olguín P, Davis M, Chi NC, Puvindran V, Gaborit N, Sukonnik T, Wylie JN, Brand-Arzamendi K, Farman GP, Kim J, Rose RA, Marsden PA, Zhu Y, Zhou YQ, Miquerol L, Henkelman RM, Stainier DY, Shaw RM, Hui CC, Bruneau BG, Backx PH. Iroquois homeobox gene 3 establishes fast conduction in the cardiac His-Purkinje network. *Proceedings of the National Academy of Sciences USA*. 2011 Aug 16;108(33):13576-81. PMCID: PMC3158173 ***contributed equally**
10. **Smyth JW** and Shaw RM. Visualizing cardiac ion channel trafficking pathways. *Methods in Enzymology*. 2012;505:187-202. PMID: 22289454

11. **Smyth JW** and Shaw RM. The gap junction life cycle. *Heart Rhythm*. 2012 Jan;9(1):151-3. PMID: PMC3210376
12. Lamouille S, Connolly E, **Smyth JW**, Akhurst RJ, Derynck R. TGF- β induced activation of mTOR complex 2 drives epithelial-mesenchymal transition and cell invasion. *The Journal of Cell Science*. 2012 Mar 1;125(Pt 5): 1259-73. PMID: PMC3324583
13. **Smyth JW**, Vogan JM, Buch PJ, Zhang SS, Fong TS, Hong TT, Shaw RM. Actin cytoskeleton rest stops regulate anterograde traffic of connexin 43 vesicles to the plasma membrane. *Circulation Research*. 2012 Mar 30;110(7):978-89. PMID: PMC3621031 **cover article**
14. Horiuchi D, Kusdra L, Huskey NE, Chandriani S, Lenburg ME, Gonzalez-Angulo AM, Creasman KJ, Bazarov AV, **Smyth JW**, Davis SE, Yaswen P, Mills GB, Esserman LJ, Goga A. MYC pathway activation in triple-negative breast cancer is synthetic lethal with CDK inhibition. *The Journal of Experimental Medicine*. 2012 Apr 9;209(4):679-96. PMID: PMC3328367
15. Hong TT, **Smyth JW**, Chu KY, Vogan JM, Fong TS, Jensen BC, Fang K, Halushka MK, Russell SD, Colecraft H, Hoopes CW, Ocorr K, Chi NC, Shaw RM. BIN1 is reduced and Cav1.2 trafficking is impaired in human failing cardiomyocytes. *Heart Rhythm*. 2012 May;9(5):812-20. PMID: PMC3306544
16. **Smyth JW** and Shaw RM. Autoregulation of connexin43 gap junction formation by internally translated isoforms. *Cell Reports*. 2013 Nov;5(3):611-8. PMID: PMC3898934
17. **Smyth JW**, Zhang SS, Sanchez JM, Lamouille S, Vogan JM, Hesketh GG, Hong T, Tomaselli GF, Shaw RM. A 14-3-3 mode-1 binding motif initiates gap junction internalization during acute cardiac ischemia. *Traffic*. 2014 Jun;15(6):684-99. PMID: 24612377 **cover article**
18. Entz M, George SA, Zeitz MJ, Raisch T, **Smyth JW**, Poelzing S. Heart Rate and Extracellular Sodium and Potassium Modulation of Gap Junction Mediated Conduction in Guinea Pigs. *Frontiers in Physiology*. 2016 **in press**

Selected Conference Presentations:

1. **Smyth JW**, Sheahan BJ, and Atkins GJ. Induction of antitumor immune responses through expression of viral antigens in tumor cells using the Semliki Forest virus vector. *Poster Presentation*. 5th Gene delivery & cellular protein expression conference. Semmering, Austria. September 2001
2. **Smyth JW**, Sheahan BJ, and Atkins GJ. Semliki Forest virus and its vector as tumor therapy agents. *Oral Presentation*. 152nd Society for General Microbiology meeting, Edinburgh, Scotland. August 2003

3. **Smyth JW**, Hong TTH, Gao D, Jain M, Jensen B, Fong T, Simpson P, Stainier D, Chi N, Shaw RM. Oxidative stress interferes with targeted delivery of connexons to plaques. *Oral Presentation*. American Heart Association Scientific Sessions. New Orleans. November 2008
4. **Smyth JW**, Hong TTH, Gao D, Vogan J, Jensen B, Fong T, Simpson P, Stainier D, Chi N, Shaw RM. Oxidative stress interferes with targeted delivery of connexons to plaques. *Poster Presentation*. Keystone Symposium: Common Mechanisms in Arrhythmias and Heart Failure. Keystone. April 2009
5. **Smyth JW**, Sanchez JM, Lamouille S, Vogan JM, Fong T, Hong TT, Shaw RM. A 14-3-3 mode-1 binding motif promotes gap junction internalization during acute cardiac ischemia. *Poster Presentation*. Gordon Research Conference on Cardiac Arrhythmia Mechanisms. Ventura. February 2013
6. **Smyth JW**, Sanchez JM, Lamouille S, Vogan JM, Fong T, Hong TT, Shaw RM. A 14-3-3 mode-1 binding motif promotes gap junction internalization during acute cardiac ischemia. *Oral Presentation*. International Gap Junction Conference. Charleston. June 2013
7. **Smyth JW** and Shaw RM. Autoregulation of connexin 43 gap junction formation by internally translated isoforms. *Poster Presentation*. American Heart Association Scientific Sessions. Dallas. November 2013
8. James CC*, Zeitz MJ*, Jones GE, Lamouille S, **Smyth JW**. Alternate translation initiation regulates gap junction losses during epithelial-mesenchymal transition. *Oral Presentation* Connexin and Pannexin subgroup meeting & *Poster Presentation* American Society for Cell Biology Annual Meeting, San Diego, December 2015
*contributed equally

Invited Seminars

1. **Smyth JW**. New Insights into Regulation of Electrical Coupling in the Heart. Virginia Tech Life Science Seminar (VTLSS). Virginia Tech, Blacksburg, VA. September 2014
2. **Smyth JW**. New insights into regulation of connexin43 and cardiac electrical coupling: from internal translation to trafficking. Departments of Cellular & Molecular Medicine, Chemistry & Biochemistry, and Molecular & Cellular Biology joint seminar series. University of Arizona, Tucson, AZ. April 2015
3. **Smyth JW**. Tackling translation to restore connexin43 gap junction coupling in disease. Cardiovascular Research Institute, Department of Cell Biology and Molecular Medicine, Rutgers New Jersey Medical School, Rutgers University, Newark, NJ. September 2015

5. PROFESSIONAL MEMBERSHIPS

American Heart Association (2007-current)

American Society for Cell Biology (2014-current)