

# CECILE M. PERRAULT

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## EDUCATION

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| May 2007    | <b>University of Florida</b><br><i>Ph.D. in Biomedical Engineering</i> <ul style="list-style-type: none"><li>• Dissertation title: "Cellular Adhesion of Normal and Cancerous Colon Cells: Effects of Surface Topographies"</li><li>• Advisor: Dr. Roger Tran-Son-Tay</li></ul> | Gainesville, FL<br>USA |
| August 2003 | <b>University of Florida</b><br><i>Master of Engineering in Biomedical Engineering</i> <ul style="list-style-type: none"><li>• Advisor: Dr. Roger Tran-Son-Tay</li></ul>                                                                                                        | Gainesville, FL<br>USA |
| May 2001    | <b>University of Florida</b><br><i>Bachelor of Science in Engineering Science</i><br><i>Minor in biomechanics.</i>                                                                                                                                                              | Gainesville, FL<br>USA |

## WORK EXPERIENCE

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| 2012- Present | <b>UNIVERSITY OF SHEFFIELD</b><br><i>Lecturer in Mechanical Engineering,</i><br><i>Cellular Mechanics and Microfluidics lab</i>                                                                                                                                                                                                                                                                                                                                                                                                             | Sheffield, UK          |
| 2009- 2012    | <b>THE INSTITUTE OF BIOENGINEERING<br/>OF CATALUNYA</b><br><i>Postdoctoral Fellow,</i><br><i>Biomechanics and Mecanobiology lab</i> <ul style="list-style-type: none"><li>• Development of a microfluidic chamber for mechanotransduction mechanism of mesenchymal stem cells</li><li>• Development of cellular model incorporating intracellular elements into the rheological properties of cells.</li><li>• Advisor: Dr. Damien Lacroix</li></ul>                                                                                        | Barcelona,<br>Spain    |
| 2007- 2009    | <b>McGILL UNIVERSITY</b><br><i>Postdoctoral Fellow,</i><br><i>Micro and Nano Bioengineering lab</i> <ul style="list-style-type: none"><li>• Development and installation of the MicroFluidic Probe, a microfluidic system for protein deposition and fluidic manipulation</li><li>• Development of a surface with varying rigidity to study the growth and migration of neural cells</li><li>• Co-coordinator for the construction and installation of the Micro and Nano Bioengineering lab</li><li>• Advisor: Dr. David Juncker</li></ul> | Montréal, QC<br>Canada |

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| 2002-2007 | <p><b>UNIVERSITY OF FLORIDA</b><br/> <i>Graduate Research Assistant,</i><br/> <i>Blood rheology and cellular mechanics lab</i></p> <ul style="list-style-type: none"> <li>• Design and fabrication of specific microtopographies by photolithography and softlithography to study cellular adhesion of normal and colon cancer cells</li> <li>• Actively participated in 2 external and 2 internal collaborations</li> <li>• Responsible for the daily run of the biorheology and cellular mechanics lab</li> <li>• Advisor: Dr. Roger Tran-Son-Tay</li> </ul> | Gainesville, FL,<br>USA |
| 1999-2002 | <p><b>UNIVERSITY OF FLORIDA</b><br/> <i>Undergraduate Research Assistant,</i><br/> <i>Blood rheology and cellular mechanics lab</i></p> <ul style="list-style-type: none"> <li>• Cellular manipulation by micropipette to assess the rheological alteration of white blood cells in diabetic mice</li> <li>• Advisor: Dr. Roger Tran-Son-Tay</li> </ul>                                                                                                                                                                                                        | Gainesville, FL,<br>USA |

## RESEARCH EXPERIENCE

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### CELLULAR MECHANICS

- Cellular manipulation systems (micropipette, parallel plate flow chamber, rheometer)
- Biomechanical studies of cells (viscosity, growth, motility, deformation and adhesion capability).
- Biorheological studies of healthy and diseased cells (diabetes, cancer, cardiovascular disease)
- Culture and use of various cell type (white blood cells, epithelial, stem cells, spermatides, neural cells).

### MICROENGINEERED SURFACES

- Design and fabrication of specific microtopographies
- Studies with multiple biomaterials (PDMS, polystyrene, silicon, matrigel, agarose, polyacrilamide gels)

### MICROFLUIDICS

- Design, fabrication and testing of a flow chamber for study of growth and detachment of cells by use of photolithography
- Design, fabrication and testing of a centrifugal test for study of growth and detachment of cells
- Device design and fabrication of a PDMS device for studies on cell deformation
- Installation and development of a microfluidic manipulation system ( the MicroFluidic Probe)

### MICROFABRICATION

- Soft lithography
- Photolithography
- Hot Embossing

## **TECHNICAL SKILLS**

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### **ANALYTICAL EQUIPMENT**

Micropipette technique, Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM), Optical Microscopy, Deconvolution Microscopy, Quartz Crystal Microbalance (QCM), Confocal Microscopy

### **LABORATORY TECHNIQUES**

Cell Culture, Microinjection of Cells, Immunofluorescent staining and imaging, Microfluidics, Sterile Technique, Photolithography, Soft Lithography, Plasma treatment, Hot embossing, Photopolymerisation, plasma bonding.

### **COMPUTER SOFTWARES**

AutoCAD Mechanical Desktop, MATLAB, FORTRAN, LabVIEW, HTML, PHP, Microsoft Office, Open Office, The GIMP, NIH ImageJ, Sigma Stat, Sigma Plot, Minitab, Automatic Dynamic Incremental Nonlinear Analysis (ADINA), COMSOL.

## **TEACHING EXPERIENCE**

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### **LECTURER**

- MAC2311 Calculus I ( summer 2006)
  - Curriculum design, lecturing, tutoring, homeworks and exams design and grading.

### **TEACHING ASSISTANT**

- Micro and Nano(bio)technology (Spring 2008, Spring 2009)
  - Lecturing and application demonstrations
- EGM 6855 Biofluids and Bioheat (Spring 2004)
  - Lecturing, tutoring, homeworks and exams grading.
- EGM 6934, Microfluidics and BioMEMS ( Spring 2006)
  - Tutoring, homeworks design and grading.
- EGM 2511, Engineering Mechanics-Statics (Fall 2005)
  - Lecturing, tutoring, homeworks and exams grading
- EGM 3400, Elements of Dynamics (Fall 2006)
  - Lecturing, tutoring, homeworks and exams grading

### **RESEARCH MENTOR**

- Mentored high-school students for summer internships and science fair projects
- Mentored four undergraduate student volunteers over the course of two years

## **PROFESSIONAL AFFILIATIONS & LEADERSHIP EXPERIENCE**

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Member of the European Society of Biomechanics. 2009- Current

Member of BioQuebec. 2008

Member of the Gainesville Area Innovation Network. 2003-2006

Peer-Reviewer of the Annals of Biomedical Engineering, Lab on a Chip. 2008-Current

Officer of the Biomedical Engineering Society, UF chapter. 1999-2007

Chair of the Biotechnology Panel at the Engineering Day in UF 2003

Biomedical Engineering Graduate Student Association at UF (Co-Founder and Secretary). 2002-2005

Microbiology Student Association, UCF chapter. 1998

## **COMMUNITY SERVICE EXPERIENCE**

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Regional Science Fair Judge, Montreal, Canada. 2009

Tax Committee, Postdoc Association, McGill University, Montreal, Canada. 2008-2009  
 Girlscout leader and Webmaster, Montreal, Canada. 2008  
 Regional Science Fair Judge, Gainesville, FL. 2007  
 Co-founder of the Alliance Française chapter, Gainesville, FL. 2006  
 Lecturer for the Step-Up (Successful Transition through Enhanced Preparation for Undergraduate Program) program, University of Florida, Gainesville, FL. 2006  
 Volunteer at the homeless shelter St Francis House, Gainesville, FL. 2005

## GRANTS/AWARDS

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- Pruitt Family Department of Biomedical Engineering Most Outstanding Student. 2007.
- President's recognition for Outstanding Students. 2003,2004.
- Alpha-1 Fellowship. 2003-2006.
- The Costello Scholarship. 2003.
- The Tillie, Jennie & Harold Schwartz Foundation Award. 2003.
- BMES Student travel award. 2002-2006
- Graduate Student Council Travel Award. 2003, 2004,2006.
- WEPAN GE FFF Travel Stipend. 2002.
- University of Florida Research Fellowship. 2001-2002
- UF Biomedical Engineering Society Design Competition. Second place. 2001.
- Undergraduate Research Competition. First place. 2001.
- Undergraduate Scholars Research Program Recipient. 1999.

## PUBLICATIONS

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### REFEREED JOURNAL ARTICLES / PROCEEDINGS / BOOK CHAPTERS

1. **Perrault CM.**, Andrews AM., Glover SC, Tran-Son-Tay R., Topographical Influence on Cellular Detachment in Cancer using a Normal Force Detachment Assay. *Ann. Biomed. Eng.* (submitted)
2. **Perrault CM**, Qasaimeh MA, Brastaviceanu T, Anderson K, Kabakibo Y, Juncker D. Integrated microfluidic probe station. *Rev Sci Instrum.* 2010 Nov;81(11):115107. *Also featured in Virtual Journal of Biological Physics Research, Volume 20, Issue 11*
3. Rapier R, Huq J, Vishnubhotla R, Bulic M, **Perrault CM**, Metlushko V, Cho M, Tay RT, Glover SC. The extracellular matrix microtopography drives critical changes in cellular motility and Rho A activity in colon cancer cells. *Cancer Cell Int.* 2010 Jul 28;10:24.
4. Queval A., Ghattamaneni N.R, **Perrault CM**, Gill R, Mirzaei M, McKinney RA and JunckerD. Chamber and Microfluidic Probe for Microperfusion of Organotypic Brain Slices. *Lab Chip.* 2010 Feb 7;10(3):326-34.
5. **Perrault CM**, Qasaimeh MA, Juncker D. The microfluidic probe: operation and use for localized surface processing. *J Vis Exp.* 2009 Jun 4;(28). pii: 1418.
6. Segal MS, Shah R, Afzal A, **Perrault CM**, Chang K, Schuler A, Beem E, Shaw LC, Li Calzi S, Harrison JK, Tran-Son-Tay R, Grant MB. Nitric oxide cytoskeletal-induced alterations reverse the endothelial progenitor cell migratory defect associated with diabetes. *Diabetes.* 2006 Jan;55(1):102-9.
7. Glover S, Nathaniel R, Shakir L, **Perrault C**, Anderson RK, Tran-Son-Tay R, Benya RV. Transient upregulation of GRP and its receptor critically regulate colon cancer cell motility during remodeling. *Am J Physiol Gastrointest Liver Physiol.* 2005 Jun;288(6):G1274-82.
8. Wolski KM, **Perrault C**, Tran-Son-Tay R, Cameron DF. Strength measurement of the Sertoli-spermatid junctional complex. *J Androl.* 2005 May-Jun;26(3):354-9.
9. **Perrault CM**, Bray EJ, Didier N, Ozaki CK, Tran-Son-Tay R. Altered rheology of lymphocytes in the diabetic mouse. *Diabetologia.* 2004 Oct;47(10):1722-6.
10. Glover S, Delaney M, **Dematte C**, Kornberg L, Frasco M, Tran-Son-Tay R, Benya RV. Phosphorylation of focal adhesion kinase tyrosine 397 critically mediates gastrin-releasing

peptide's morphogenic properties. *J Cell Physiol.* 2004 Apr;199(1):77-88. (\*Dematte was a former married name )

## PRESENTATIONS ( ORAL AND POSTER)

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1. **Perrault C.M.**, Navajas D., Trepas X., Planell J., Lacroix D. (July 2012) *Microfluidic study of endothelial cell traction force under shear stress*. ESB 2012: 18th Congress of the European Society of Biomechanics. Lisbon, Portugal (Type: Oral)
2. Barreto S., **Perrault C.M.**, Lacroix D. (Oct 2011) *Computational Prediction Of External And Internal Cell Forces-Regulation By The Individual Fibers Of The Cytoskeleton* CMBBE2012: 10th International Symposium on Biomechanics and Biomedical Engineering. Berlin, Germany (Type: Oral)
3. Olivares,A, **Perrault CM**, Lacroix D. (Apr. 2012) *Cell seeding optimization in 3D scaffold under dynamic condition: Computational and Experimental method*. CMBBE2012: 10th International Symposium on Biomechanics and Biomedical Engineering. Berlin, Germany (Type: Oral)
4. **Perrault C.M.**, Navajas D., Trepas X., Planell J., Lacroix D. (Oct. 2011) *Microfluidic Studies of Traction Forces and Shear Stress*. CellMech 2011. Amsterdam, Netherlands (Type: Poster)
5. Barreto S., **Perrault C.M.**, Lacroix D. (Oct 2011) *Modelling the mechanical response of a single cell in magnetic twisting cytometry:contribution of the cytoskeleton filaments*. CellMech 2011. Amsterdam, Netherlands (Type: Poster)
6. **Perrault C.M.**, Navajas D., Trepas X., Planell J., Lacroix D. (Aug. 2010) *Cellular Response to Shear Stress Evaluated with Traction Force Microscopy*. 6th World Congress on Biomechanics. Singapore, Singapore (Type: Oral)
7. **Perrault C.M.**, Juncker D. (October 2009). Multiple gradient patterning with a multiplex microfluidic probe. 3<sup>rd</sup> European Meeting on Cell Mechanics, Bad Honnef, Germany (Type: Oral)
8. **Perrault C.M.**, Anderson K., Qasaimeh M.A., Juncker D. (October 2008). Microfluidic probe with multiple injection streams. Annual meeting of the Biomedical Engineering Society (BMES), St. Louis, USA. (Type: Poster)
9. Queval A. , **Perrault CM**, Qasaimeh MA, Mckinney A., and Juncker D (October 2008). Design and Fabrication of a PDMS Probe and Perfusion Chamber for Microfluidic Experiments with Organotypic Brain Slices. MicroTAS 2008, The Twelfth International Conference on Miniaturized Systems for Chemistry and Life Sciences, San Diego, California, USA. (Type: Poster)
10. Qasaimeh MA, Sanyal P, Safavieh R, **Perrault CM**, Queval A, and Juncker D. (October 2008) The Generation of Stationary Chemical Gradients Around Stagnant Points Using A Microfluidic Probe. MicroTAS 2008, The Twelfth International Conference on Miniaturized Systems for Chemistry and Life Sciences, San Diego, California, USA. (Type: Poster)
11. **Perrault CM.**, Juncker D., Park H. (July 2008) Preparation and Shear Modulus of Polyacrylamide Gels as Nerve Cell Culture. XVth International Congress on Rheology, Monterey, CA. (Type: Oral)
12. Sanyal P., **Perrault C. M.**, Nobari S., Pla-Roca M., Kabakibo Y. and Juncker D. ( August 2007) Microfabrication of transparent microfluidic probes with high density world-to-chip interconnections. CWMEMS 2007, 5th Canadian Workshop on MEMS and Microfluidics, Montréal, Canada. (Type: Poster)
13. **Perrault C.**, Andrews A., Orr, J., Schumacher J., Brennan A., Glover SG, Tran-Son-Tay R. (October 2006) Effects of Surface Topography on Cell Adhesion. 2006 BMES Annual Fall Meeting, Chicago, IL. (Type: Oral)
14. Glover S, Anderson R, **Perrault C**, Tay RTS, Benya R. (May 2005). Extracellular matrix (ecm) nanotopography and tumor cell behavior in colon cancer: Evidence for a positive feedback loop. Annual Meeting of the American-Gastroenterological-Association/Digestive-Disease-Week, Chicago, IL. (Type: Poster)

15. **Perrault C.**, Glover S., Benya R.V., Tran-Son-Tay . (October 2004). *Role of Extracellular Matrix Microtopography on the Regulation of Cell Motility and Morphology*. 2004 BMES Annual Fall meeting, Philadelphia, PA. (Type: Poster)
16. **Perrault C**, Glover S, Sherman E, Tran-Son-Tay R, Benya RV. (May 2004). Focal adhesion kinase (FAK) activation by gastrin-releasing peptide (GRP) enhances cell sequestration in artificial hepatic sinusoids. Digestive Disease Week/105th Annual Meeting of the American-Gastroenterological-Association, New Orleans LA. (Type: Oral)
17. Glover S, **Perrault C**, Tran-Son-Tay R, Benya RV. (May 2004). Microtopography of the extracellular matrix critically regulates cell motility and morphology. Digestive Disease Week/105th Annual Meeting of the American-Gastroenterological-Association, New Orleans LA . (Type: Poster)
18. **Perrault-Dematte C.**, Glover S., Benya R.V., Tran-Son-Tay R. (October 2003). *Effects of FAK and surface roughness on cell growth*. 2003 BMES Annual Fall meeting, Nashville, TN. (Type: Oral)
19. **Perrault-Dematte C.**, Benya R.V, Glover S., Tran-Son-Tay R. (June 2003). *Influence of GRP Receptor-Induced Phosphorylation of FAK Tyrosine 397 on Cell Deformability and Blebbing*. 2003 Summer Bioengineering Conference, Key Biscayne, FL. (Type: Oral)
20. Tran-Son-Tay, R.; Branham, M.; Glover, S.; **Perrault, C.**; Benya, R.; Allen, S. D.; Shyy, W. (Sept. 2002) A rapid prototyping technique for studying contribution of extracellular microtexture to cell shape, attachment and spreading. 11th International Congress of Biorheology and 4th International Conference on Clinical Hemorheology, Antalya, Turkey . (Type: Oral)