CURRICULUM VITAE

Roberto C. Andresen Eguiluz

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Biographical Data

Date and Place of Birth	May 09, 1980, Mexico City, Mexico
Citizenship	Mexican

Employment Authorization based on concurrently filed and pending National Interest Waiver and Adjustment of Status

Education

Ph.D. 02/2010 – 10/2014
in Materials Science and Engineering
Cornell University (USA)
Advisor: Prof. Delphine Gourdon
Thesis: Role of fibronectin in tumor development and joint lubrication

Master 02/2010 – 07/2013
in Materials Science and Engineering
Cornell University (USA)
Advisor: Prof. Delphine Gourdon

Master 02/2008 – 01/2010
in Materials Science and Engineering
Instituto de Investigaciones en Materiales, UNAM (Mexico)
Advisor: Prof. Rafael Schouwenaars
Magna cum laude
Thesis: Análisis de la tribocapa de la aleación SAE 783 ensayada en un tribómetro coaxial (Analysis of the tribolayer of SAE 783 alloy tested in a coaxial tribometer)

Bachelor in Mechanical Engineering 11/2001 – 09/2007
Faculty of Engineering, UNAM (Mexico)
Mobility year at ETH Zurich (Switzerland)
Advisor: Prof. Rafael Schouwenaars

Thesis: Modelado y simulación de los proceso de laminado y co-laminado en Mathematica® (Modeling and simulation of sheet and sandwich sheet rolling with Mathematica®)

Languages: fluent in Spanish, German, English, basic French

Professional Experience

Postdoctoral Scholar 08/2017 – present
Department of Chemical Engineering, University of California Santa Barbara (USA)
Principal investigator: Prof. Jacob N. Israelachvili

Postdoctoral Research Associate 02/2015 – 06/2017
Department of Chemical and Biomolecular Engineering, University of Illinois at Urbana-Chapmaign (USA)
Principal investigator: Prof. Deborah E. Leckband

Research Assistant 02/2010 – 10/2014
Department of Materials Science and Engineering, Cornell University (USA)
Principal investigator: Prof. Delphine Gourdon

Research Assistant 10/2006 – 01/2010
Unidad de Investigación y Asistencia Técnica en Materiales at Faculty of Engineering, Universidad Nacional Autónoma de México, (Mexico)
Principal investigator: Prof. Armando Ortiz Prado

Research Assistant 11/2005 – 07/2006
Laboratory of Applied Mechanobiology, Department for Health Sciences and Technology, Eidgenssische Technische Hochschule Zürich (Switzerland)
Principal investigator: Prof. Viola Vogel

Research Interests and Skills

Research Interests

- Mechanobiology and mechanotrandsuction
- Soft biological surfaces functionalization, lubrication and repair
- Surface forces and tribology
- Nano-biomechanics, structure and interactions of soft interfaces (tissue, cells and proteins)

Competencies

- **Characterization**: surface forces apparatus, atomic force microscopy, scanning electron microscopy, confocal microscopy, contact and optical profilometry, immunostaining, microindentation, traction force microscopy, strain gauging, universal testing machine.
- **Manufacturing**: photolitography, thermal evaporation, lathe/mill cutting, cold rolling, sandwich cold rolling, PDMS casting and patterning, microfabrication.
- **Computer languages and packages**: Mathematica, Ansys, Abaqus, LaTex, Origin, Adobe Ilustrator, ImageJ, Gwyddion.

Grants and Fellowships

Fellowships

CONACyT postgraduate fellow for doctoral studies abroad
08/2010 - 06/2014, funding period: 4 years

CONACyT postgraduate fellow for excellence studies
02/2008 - 01/2010, funding period: 2 years

Publications

12. A. P. Kourouklis*, **R. C. Andresen Eguiluz***, D. E. Leckband, G. H. Underhill,
"Cadherin-induced bipotential mouse embryonic liver cell differentiation of a spheroid 3D model,"
in preparation. *equal contribution

11. Z. Rahil, **R. C. Andresen Eguiluz**, K. B. Kaylan, V. Vu,G. H. Underhill, D. E. Leckband
"Homophilic and heterophilic cadherin mechanotransduction dictates stress distributions on epithelial monolayers,"
in preparation.

10. J. J. Madinya*, L. Kisley*, **R. C. Andresen Eguiluz***, S. T. Ahmed,N. S. Shiroor, D. E. Leckband
"Effect of MW and solvent quality on normal forces of zwitterionic polymer brushes,"
in preparation.
*equal contribution

9. **R. C. Andresen Eguiluz**, K. B. Kaylan, G. H. Underhill, D. E. Leckband
"Substrate stiffness enhances VE-cadherin mechanotransduction,"
Biomaterials, 140: 45-57 (2017).

8. **R. C. Andresen Eguiluz***, S. G. Cook*, M. Tan, C. N. Brown, N. J. Pacifici, L. J. Bonassar, D. Putnam, D. Gourdon
"Synergistic interactions of a synthetic lubricin mimetic with fibronectin for enhanced wear protection,"
Frontiers in Bioengineering and Biotechnology - Biomaterials, 5: 1-13 (2017).
* equal contribution

7. K. J. Samaroo, M. Tan, **R. C. Andresen Eguiluz**, D. Gourdon, D. Putnam, L. J. Bonassar
"Tunable lubricin-mimetics for boundary lubrication of cartilage,"
BioTribology, 9: 18-23 (2017).

6. **R. C. Andresen Eguiluz**, S. G. Cook, C. N. Brown, F. Wu, N. J. Pacifici, L. J. Bonassar, D. Gourdon
"Fibronectin mediates enhanced wear protection of lubricin during shear,"
Biomacromolecules 16(9): 2884 2894 (2015).

5. B. R. Seo, P. Bhardwaj, S. Choi, J. Gonzalez, **R. C. Andresen Eguiluz**, K. C. Wang, S. Mohanan, P. G. Morris, B. Du, X. K. Zhou, L. T. Vahdat, A. Verma, O. Elemento, C. A. Hudis, R. M. Williams, D. Gourdon, A. J. Dannenberg, C. Fischbach
"Obesity-dependent changes of interstitial ECM mechanics and their role in breast tumorigenesis,"
Science Translational Medicine 7, 301ra130 (2015).

4. K. C. Wang*, **R. C. Andresen Eguiluz***, F. Wu,B. R. Seo, C. Fischbach, D. Gourdon
"Stiffening and unfolding of fibronectin increase proangiogenic factor secretion by breast cancer-associated stromal cells,"
Biomaterials 54: 63-71 (2015).
* equal contribution

3. E. M. Chandler, B. R. Seo, J. P. Califano, **R. C. Andresen Eguiluz**, J. S. Lee, C. J. Yoon, D. T. Tims, J. X. Wang, L. Cheng, S. Mohanan, M. R. Buckley, I. Cohen, A. Y. Nikitin, D. Gourdon, C. A. Reinhart-King, C. Fischbach
"Adipose progenitor cells - physicochemical regulators of breast tumorigenesis,"
PNAS 109(25): 9786-91 (2012).

2. **R. C. Andresen Eguiluz**, A. Bravo Benard, M. A. Ramirez Toledo,

H. A. Duran Cortes, A. Ortiz Prado, R. Schouwenaars
"Formación de una capa tribológica en la aleación SAE-783,"
Ingeniería Mecánica Tecnológia y Desarrollo 3(3): 85-90 (2009).

1. M. L. Smith, D. Gourdon, W. C. Little, K. E. Kubow, **R. C. Andresen Eguiluz**, S. Luna-Morris, V. Vogel
"Force-Induced Unfolding of Fibronectin in the Extracellular Matrix of Living Cells,"
PLoS Biol. 5(10): e268 (2007).

Book chapters

1. **R. C. Andresen Eguiluz**, R.M. Shur, D. Gourdon
"Biopolymers: Lubrication and Adhesion by Charged Biopolymers for Biomedical Applications,"
Book edited by: Magdy Elnashar, ISBN: 978-953-307-109-1, Sciyo, September 2010

Refereed Conference Proceedings

3. K. C. Wang, **R. C. Andresen Eguiluz**, F. Wu, B. R. Seo, V. Benson, C. N. Brown, C. Fischbach, D. Gourdon
"Altered Unfolding and Stiffening of Fibronectin for Tumor Progression,"
in Bioengineering Conference (NEBEC) 2014 40th Annual Northeast, Boston, MA, USA.

2. R.M. Shur, **R. C. Andresen Eguiluz**,D. Gourdon
"Shear-induced adhesion in mussel foot protein-1 films,"
in Society for Biomaterials 2011, Orlando, FL, USA.

1. **R. C. Andresen Eguiluz**, M. L. Smith, E. Klotzsch, V. Vogel, D. Gourdon
"Anastellin irreversibly alters the mechanical properties of extracellular matrix fibronectin fibers,"
in Society for Biomaterials 2010, Seattle, WA, USA.

Theses

3. **R. C. Andresen Eguiluz**, Ph.D. thesis, Cornell University, USA 2014
"Role of fibronectin in tumor development and joint lubrication"

2. **R. C. Andresen Eguiluz**, Master thesis, IIM-UNAM, Mexico 2010
"Análisis de la tribocapa de la aleación SAE 783 ensayada en un tribómetro coaxial"

1. **R. C. Andresen Eguiluz**, Bachelor thesis, FI-UNAM, Mexico 2007
   "Mathematica®como herramienta para la simulación libre de mallas: los ejemplos de laminado y colaminado"

Teaching

Teaching Assistant, Department of Materials Science and Engineering, Cornell University, USA

"Biomaterials for the skeletal system"	Fall – 2011

Undergraduate Lecturer, Faculty of Engineering, Universidad Nacional Autónoma de México, Mexico

"Manufacturing processes I"	Fall – 2009
"Manufacturing processes I"	Spring – 2009

Undergraduate Lecturer, Department of Engineering, Universidad Iberoamericana, Mexico

"Computational product simulation"	Spring – 2009
"Computational design and innovation"	Spring – 2009
"Computational product simulation"	Fall – 2008
"Computational design and innovation"	Fall – 2008
"Turbomachinery laboratory"	Summer – 2008
"Manufacturing processes"	Spring – 2008
"Computational product simulation"	Fall – 2007

Invited Talks and Seminars

Seminar, Pontificia Universidad Católica de Chile, Santiago de Chile, Chile, 04/2017
"Mecánica, adhesión y lubricación de tres biopolímeros"

Seminar, Eidgenssische Technische Hochschule Zürich, Switzerland, 11/25/2013
"Stiffening of the cancerous extracellular matrix induced by fibronectin fiber unfolding and thickening"

Seminar, Science, Technology, Engineering, and Mathematics Graduate Seminars , Cornell University, Ithaca NY, USA, 07/2013
"Fibronectin structure and extracellular matrix mechanics in breast cancer"

Seminar, Pontificia Universidad Católica de Chile, Santiago de Chile, Chile, 12/2012
"Mecánica, adhesión y lubricación de tres biopolímeros"

Seminar, Universidad de Valparaíso, Valparaíso, Chile, 12/2012
"Mecánica, adhesión y lubricación de tres biopolímeros"

Seminar, Annual Biomedical Engineering Research Retreat, Cornell University, Ithaca NY, USA, 08/2011
"Mechanics, adhesion and lubrication of biological materials"

Conference Contributions

Talks

American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, USA, 11/2016
"VE-cadherin endothelial force transduction"

Annual Meeting of the Biomedical Engineering Society, Minneapolis, MN, USA, 10/2016
"VE-cadherin signals and substrate stiffness regulate force transduction through endothelial monolayers"

10th World Biomaterials Congress, Montreal, QC, Canada, 05/2016
"Fibronectin regulates enhanced wear protection of lubricin and mimetic lubricin during shear"

89th ACS Colloid and Surface Science Symposium, Pittsburgh, PA, USA, 06/2015
"Fibronectin tethers synovial fluid components in the superficial zone of cartilage"

2nd International Conference on BioTribology, Toronto, ON, Canada, 05/2014
"Correlating surface adsorption, repulsive interactions and lubrication of lubricin-mimetic polymers"

Fall Meeting of the Materials Research Society, Boston MA, USA, 12/2013
"Extracellular matrix morphology and mechanics in breast cancer"

Spring Meeting of the Materials Research Society, San Francisco CA, USA, 04/2012
"Breast Tumor Soluble Factors Stiffen ECM"

Annual Meeting of the Biomedical Engineering Society, Hartford CT, USA, 10/2011

"Tumor-mediated extracellular matrix stiffening at the molecular and cellular scales"

Fall Meeting of the Materials Research Society, Boston MA, USA, 12/2010
"Fibronectin mechanics and its role in tumor stiffness"

11th New York Complex Matter Workshop, NY, USA, 06/2010
"Strongly Protective or Adhesive protein nanofilms"

15th International Annual SOMIM Congress, Cd. Obregón, Sonora, Mexico, 09/2009
"Formacin de una capa tribolgica en la aleacin SAE-783"

Posters

Spring Meeting of the Materials Research Society, San Francisco CA, USA 04/2012
"Breast Tumor Soluble Factors Stiffen Extracellular Matrix"

Annual Meeting of the Biomedical Engineering Society, Hartford CT, USA 10/2011
"Biomimetic Boundary Lubricants of Articular Cartilage"

Cornell Center for Materials Research Annual Symposium, Ithaca NY, USA 05/2011
"Synthesis of Biomimetic Boundary Lubricants of Articular Cartilage"

Fall Meeting of the Materials Research Society, Boston MA, USA 12/2010
"Shear-Induced Adhesion in Films of Mussel Foot Protein-1"

XXXI International Congress of Metallurgy and Materials, Saltillo, Coahuila de Zaragoza, Mexico 10/2009
"Caracterización microestructural y mecánica de la tribocapa formada en una aleación Al-Sn ensayadas en un tribómetro coaxial"

International Congress Materia 2007, Morelia, Michoacán, Mexico 10/2007
"Modelling and simulation of cold sheet rolling and sandwich sheet rolling processes using Mathematica®"

Miscellanea

Professional Memberships

Member of the Materials Research Society (since 2011)
Member of the Biomedical Engineering Society (since 2011)

Member of the American Chemical Society (since 2015)
Member of the National Postdoctoral Association (since 2015)
Member of the Society of Postdoctoral Scholars of UIUC, web master (2015-2016)
Member of the American Institute of Chemical Engineers (since 2016)

Hobbies

Carpentry, trekking, hiking, camping, mountain biking, skating, snowboarding, and timelapse photography.

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