

Cristina Bertocchi, PhD

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Contact details:

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Research areas

Mechanobiology, cell-cell adhesion, superresolution

Education and degrees

- ✓ **Graduation as Doctor Rerum Naturalium, PhD** (October 2008). Grade: Excellent, passed with distinction; title of experimental thesis: “Alveolar Type II Cells: from Exocytosis to Surfactant activation”
Doctoral study in “lung physiology and surfactant biophysics” c/o Department of Physiology and Medical Physics, Medical University of Innsbruck – University of Innsbruck
- ✓ **Master’s degree in biology** (February 2002). Grade: 100 / 110; title of experimental thesis: “Ion channels in pleural mesothelial cells”
Study of biology c/o “Università degli Studi di Milano, Facoltà di Scienze Matematiche Fisiche e Naturali, Corso di Laurea in Scienze Biologiche” (Faculty of Biology c/o University of Milan, Italy) with specialization in “molecular biology”
- ✓ **Teaching Diploma** (January 2020) – University teaching certificate - Pontificia Univ. Católica de Chile.

Professional experiences

June 2018-Present

Topics: **Investigation of mechanotransduction at cell adhesion in health and disease**

Job role: Assistant Prof. at Physiology Department, Pontificia Universidad Católica de Chile (Santiago, Chile)

January 2017-March 2018

Topics: **Structural analysis of protein complexes dynamics by super-resolution microscopy.**

Job role: NUS senior research fellow at Mechanobiology Institute directed by Prof M. Sheetz; National University of Singapore (Singapore).

March 2013 – December 2016

Topics: **Structural analysis of protein complexes 3D organization by super-resolution microscopy.**

Job role: Postdoc/research fellow c/o group of Prof. P. Kanchanawong; Mechanobiology Institute - National University of Singapore (Singapore).

January 2011 – January 2013

Topics: **Functional analysis of cell adhesion by high resolution microscopy and protein expression interference.**

Job role: Postdoc/research fellow c/o group of Prof. R. Zaidel-Bar; Mechanobiology Institute - National University of Singapore (Singapore).

January 2009 – December 2010

Topics: **Biomedical investigation of 1) Nitric Oxide Synthase in post-ischemic sepsis, 2) Toll-like Receptor 2 in atherosclerosis and 3) biomarkers for early diagnosis of Acute Kidney Injury**

Job role: Postdoc/research fellow – Part-time c/o group of Prof. M. Joannidis; Clinical Department of Internal Medicine, Clinical Division of General Internal Medicine, Medical University of Innsbruck (Austria).

November 2002- July 2004 and November 2004- July 2006 (in between and afterwards maternity leaves)

Topics: **Exocytosis, cell signalling, membrane biophysics.**

Job role: PhD Thesis c/o group of A.Univ.Prof. T. Haller; Subdivision of Lung Epithelial Physiology; Department of Physiology and Medical Physics; Innsbruck Medical University, Innsbruck (Austria).

January - October 2002

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Topics: **Electrophysiological characterization of chloride currents involved in cell volume regulation in reconstituted lipid bilayers.**

Job role: Visiting scientist c/o group of A.Univ.Prof. G. Meyer; Department of General Physiology and Biochemistry in the laboratory of Molecular Physiology, Milan (Italy).

October - December 2001

Topic: **Electrophysiological characterization of chloride currents involved in cell volume regulation in reconstituted lipid bilayers.**

Job role: Scientific guest c/o group of Univ.Prof. M. Paulmichl and A.Univ.Prof. M. Ritter; Subdivision of Molecular Membrane Physiology; Department of Physiology; University of Innsbruck, Innsbruck (Austria).

September 2000 - September 2001

Topics: **Electrophysiological comparison of anion currents in human mesothelial and mesothelioma cells.**

Job role: Master thesis c/o group of A.Univ.Prof. G. Meyer; Department of General Physiology and Biochemistry; Faculty of Biology; Università degli Studi di Milano, Milan (Italy).

Publication List

1. [Bertocchi C*](#), Ravasio A, Ong HT, Toyama Y, and Kanchanawong P*. **Mechanical Roles of Vinculin/ β -catenin interaction in Adherens Junction.** BIORXIV/2019/770735 (*corresponding authors)
2. Joy-Immediato M, Ramirez RM, Cerda M, Toyama Y, Ravasio A, Kanchanawong P and [Bertocchi C*](#). **Junctional ER organization affects mechanotransduction at cadherin-mediated adhesions.** Front. Cell Dev. Biol. - Cell Adhesion and Migration doi: 10.3389/fcell.2021.669086.
3. Hernández-Cáceres MP, Munoz L, Pradena J, Pena F, Lagos Munoz P, Aceiton P, Owen GI, Morselli E, Ravasio A*, and [Bertocchi C*](#). **Mechanobiology of autophagy: the unexplored side of cancer.** Front Oncol. 2021; 11:632956. eCollection 2021.
4. Hernández-Cáceres MP, Cerceda K, Hernandez S, Li Y, Narro C, Rivera P, Silva P, Ávalos Y, Jara C, Burgos P, Toledo L, Lagos P, Cifuentes F, Yu L, Perez-Leighton C, [Bertocchi C](#), Clegg D, Criollo A, Tapia C, Burgos P, Morselli E. **Palmitic acid reduces the autophagic flux in hypothalamic neurons by impairing autophagosome-lysosome fusion and endolysosomal dynamics.** Mol Cell Oncol. 2020; 7(5):1789418 eCollection 2020.
5. Ravasio A, Myaing MZ., Chia S, Arora A, Sathe A, Cao EY, [Bertocchi C](#), Sharma A, Arasi B, Chung VY, Zea TT, Chen Z, Ong HT, Huang RYJ, DasGupta R, Groves JT, Viasnoff V. **Single-cell analysis of EphA clustering phenotypes to probe cancer cell heterogeneity.** Commun Biol 2020; 3(1):429.
6. Greci G, [Bertocchi C](#), Ravasio A. **Integrating microfabrication into biomedical investigation: the benefits of interdisciplinarity.** Micromachines 2019, 10, 252.
7. [Bertocchi C](#), Wang Y, Ravasio A, Hara Y, Wu Y, Sailov T, Baird MA, Davidson MW, Zaidel-Bar R, Toyama Y, Ladoux B, Mege RM, and Kanchanawong P. **Nanoscale architecture of cadherin-based cell adhesions.** *Nature Cell Biology*. 2017 Jan;19(1):28-37.
 - ⇒ Highlighted research publication in [Nature Cell Biology](#)
 - ⇒ Highlighted research publication in [Microscopy-analysis editorial](#)
 - ⇒ Highlighted research publication in [Molecular biology of the cell](#)
 - ⇒ Included in 2018 Nature Collection on [Super-resolution microscopy](#)
 - ⇒ Cover Image of the 2018 Nature Collection on Super-resolution microscopy
8. Ravasio A, Le AP, Saw TB, Tarle V, Ong HT, [Bertocchi C](#), Mège RM, Lim CT, Gov NS, Ladoux B. **Regulation of epithelial cell organization by tuning cell-substrate adhesion.** *Integr Biol (Camb)*. 2015 Oct;7(10):1228-41.
9. Ravasio A, Cheddadi I, Chen T, Pereira T, Ong HT, [Bertocchi C](#), Brugues A, Jacinto A, Kabla AJ, Toyama Y, Trepas X, Gov N, de Almeida LN & Ladoux B. **Gap geometry dictates epithelial closure efficiency.** *Nature Commun*. 2015 Jul 9;6:7683.
 - ⇒ Week's Featured Image in Nature Communication
 - ⇒ Highlighted research publication in [Material Research Society \(MRS\) Bulletin](#)
 - ⇒ Highlighted to the public on Singapore largest newspaper [Straight Times](#)
10. [Bertocchi C](#), Goh WI, Zhang Z, Kanchanawong P. **Nanoscale Imaging by Superresolution Fluorescence Microscopy and Its Emerging Applications in Biomedical Research.** *Critical Reviews in Biomedical Engineering*, 41.4-5 (2013).
11. [Bertocchi C](#), Vaman Rao M, Zaidel-Bar R. **Regulation of adherens junction dynamics by phosphorylation switches.** *J Signal Transduct*. 2012;2012:125295.
12. [Bertocchi C](#), Traunwieser M, Dörler J, Hasslacher J, Joannidis M, Dunzendorfer S. **Atorvastatin inhibits functional expression of proatherogenic TLR2 in arterial endothelial cells.** *Cell Physiol Biochem*. 2011;28(4):625-30.

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13. Hasslacher J, Bijuklic K, [Bertocchi C](#), Kountchev J, Bellmann R, Dunzendorfer S, Joannidis M. **Levosimendan inhibits release of reactive oxygen species in polymorphonuclear leukocytes in vitro and in patients with acute heart failure and septic shock: a prospective observational study.** *Crit Care*. 2011 Jul 12;15(4):R166.
14. Ravasio A, Hobi N, [Bertocchi C](#), Jesacher A, Dietl P, Haller T. **Interfacial sensing by alveolar type II cells: a new concept in lung physiology?** *Am J Physiol Cell Physiol*. 2011 Jun;300(6):C1456-65.
⇒ Highlighted research publication in June 2011; 26 (3) issue of [Physiology](#)
15. [Bertocchi C](#), Schmid M, Hasslacher J, Dunzendorfer S, Patsch JR, Joannidis M. **Differential effects of NO inhibition in renal epithelial and endothelial cells in mono-culture vs. co-culture conditions.** *Cell Physiol Biochem*. 2010;26(4-5):669-78.
16. Schmid M, Prajczek S, Gruber LN, [Bertocchi C](#), Gandini R, Pfaller W, Jennings P, Joannidis M. **Uromodulin facilitates neutrophil migration across renal epithelial monolayers.** *Cell Physiol Biochem*. 2010;26(3):311-8.
17. Ravasio A, Olmeda B, [Bertocchi C](#), Haller T, Pérez-Gil J. **Lamellar bodies form solid three-dimensional films at the respiratory air-liquid interface.** *J Biol Chem*. 2010 Sep 3;285(36):28174-82.
18. [Bertocchi C](#), Ravasio A, Bernet S, Putz G, Dietl P, Haller T. **Optical measurement of surface tension in a miniaturized air-liquid interface and its application in lung physiology.** *Biophys J*. 2005 Aug;89(2):1353-61.
19. Jennings P* & [Bertocchi C*](#), Frick M, Haller T, Pfaller W, Dietl P. **Ca²⁺ induced surfactant secretion in alveolar type II cultures isolated from the H-2Kb-tsA58 transgenic mouse.** *Cell Physiol Biochem*. 2005;15(1-4):159-66.
⇒ *Equally contributing authors
20. Mair N, Frick M, [Bertocchi C](#), Haller T, Amberger A, Weiss H, Margreiter R, Streif W, Dietl P. **Inhibition by cytoplasmic nucleotides of a new cation channel in freshly isolated human and rat type II pneumocytes.** *Am J Physiol Lung Cell Mol Physiol*. 2004 Dec;287(6):L1284-92.
21. Dietl P, Frick M, Mair N, [Bertocchi C](#), Haller T. **Pulmonary consequences of a deep breath revisited.** *Biol Neonate*. 2004;85(4):299-304.
22. Meyer G, Rodighiero S, Guizzardi F, Bazzini C, Bottà G, [Bertocchi C](#), Garavaglia L, Dossena S, Manfredi R, Sironi C, Catania A, Paulmichl M. **Volume-regulated Cl⁻ channels in human pleural mesothelioma cells.** *FEBS Lett*. 2004 Feb 13;559(1-3):45-50.
23. Ritter M, [Bertocchi C](#), Jakab M, Fürst J, Paulmichl M. **Further characterization of the nematode IClnN2 protein reconstituted in lipid bilayers.** *Adv Exp Med Biol*. 2004;559:245-51.
24. Frick M, [Bertocchi C](#), Jennings P, Haller T, Mair N, Singer W, Pfaller W, Ritsch-Marte M, Dietl P. **Ca²⁺ entry is essential for cell strain-induced lamellar body fusion in isolated rat type II pneumocytes.** *Am J Physiol Lung Cell Mol Physiol*. 2004 Jan;286(1):L210-20.
25. Garavaglia ML, Rodighiero S, [Bertocchi C](#), Manfredi R, Fürst J, Gschwentner M, Ritter M, Bazzini C, Bottà G, Jakab M, Meyer G, Paulmichl M. **ICln Channels reconstituted in heart-lipid bilayer are selective to chloride.** *Pflugers Arch*. 2002 Mar;443(5-6):748-53.

Book chapter:

1. Hernández-Cáceres MP, Munoz L, Pradena J, Pena F, Lagos Munoz P, Aceiton P, Owen GI, Morselli E, Ravasio A*, and [Bertocchi C*](#). **Mechanobiology of autophagy: the unexplored side of cancer.** *Prime Archives in Cancer Research*. Heidari A, editor; Hyderabad, India: Vide Leaf. 2021
2. [Bertocchi C](#), Rudge T, Ravasio A. **Scanning angle interference microscopy (SAIM): acquisition, analysis and biological applications.** *CRC book: Methods in Signal Transduction series – volume: New Techniques for Studying Biomembranes* (DOI: 10.1201/9780429461385).
3. Ritter M, [Bertocchi C](#), Jakab M, Fuerst J, Paulmichl M. **Further Characterization of the Nematode IClnN2 Protein Reconstituted in Lipid Bilayers.** *Cell Volume and Signaling. Advances in Experimental Medicine and Biology* Volume 559, 2005, pp 245-251.

Teaching as Titular of the Course

- ✓ BIO152 – Bases Físicas de los Procesos Biológicos – Titular: Pregrado
- ✓ BIO4033 - Métodos de microscopía óptica, electrónica e inmunohistoquímica (Methods for optic and electron microscopy and immunohistochemistry) - Titular: Bertocchi C – Course for PhD students Physiology Programme – Pontificia Universidad Católica de Chile, August 2020 – Present
- ✓ BIO4233 – Bases celulares y moleculares de la regulación fisiológica – Titular: Bertocchi C – Course for PhD students Physiology Programme – Pontificia Universidad Católica de Chile, January 2020 – Present
- ✓ BIO141C - Biología de la Célula (Cell Biology) – Titular: Bertocchi C – Course for undergraduate Pontificia Universidad Católica de Chile, August 2019 – Present
- ✓ BIO4016 - Unidad de Investigación II - PhD Physiology Programme Pontificia Universidad Católica de Chile, November 2019
- ✓ “Good Cell Culture Practice” – Titular: Bertocchi C and Ravasio A. Lectures, practical demonstrations and mentoring for PhD students. Mechanobiology Institute, NUS, Singapore, 2013 to 2015.

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Teaching as collaborating Professor

- ✓ BIO4417 - Curso de Verano Microscopía Óptica Avanzada – Titular: Eisner V. – UMA (unidad de microscopia avanzada) Pontificia Universidad Católica de Chile, January 2020
- ✓ IBM3102 - Advanced Topics in Biological and Medical Engineering II – Titular: Ravasio A - IIBM PhD Programme Pontificia Universidad Católica de Chile, November 2019
- ✓ BIO4233 - Bases celulares y moleculares de la regulación fisiológica (Cellular and molecular basis of physiological regulation) – Titular: Morselli E. – Physiology PhD Programme Pontificia Universidad Católica de Chile, March 2019
- ✓ IIQ3662 - Seminarios de Postgrado – Titular: Ramirez C and Egaña T – Engineering PhD Programme Pontificia Universidad Católica de Chile, May 2019
- ✓ BIO4234 - Señalización para la fisiología y patofisiología (Signaling in Development) – Titular: Owen G - PhD Physiology Programme Pontificia Universidad Católica de Chile, November 2018
- ✓ BN6401 - Advanced Quantitative Fluorescence Microscopy – Titular: Kanchanawong P. - Course for undergraduate Department of Bioengineering, Faculty of Engineering, National University of Singapore.
- ✓ BN4301 - Principles of Tissue Engineering – Titular: Yim E. - Course for undergraduate Department of Bioengineering, Faculty of Engineering, National University of Singapore.

Grants

- ✓ Year 2020 Concurso Anillos en Ciencia y Tecnología 2019. Project Title: “**Multiscale mechanics and self-organizing processes in developing Systems**” (Conicyt: ACT192015)
- ✓ Year 2019 Concurso de Investigación Interdisciplinaria 2018. Project Title: “**Accessing cadherin clustering dynamics via gold nanopatterning**”.
- ✓ Year 2011 Jubiläumsfonds der Oesterreichisches National Fund (OeNB) Austria. Project Title: “**Charakterisierung und therapeutische Elimination von Mikropartikeln bei Patienten mit Sepsis**” (Characterization and therapeutic elimination of microparticles in patients with severe sepsis and septic Shock).
- ✓ Year 2010 Tiroler Wissenschaftsfond (TWF) Austria- n.: D-151610-034-011. Project Title: “**An epithelial-endothelial co-culture model to study the role of NOS in inflammatory processes**”.
- ✓ Year 2008 Vasopharm Austria. Project title: “**Mechanism of VAS203 Effects on Function of Human Renal Epithelial Cells**”.

Invited seminars last 5 years

- ✓ Invited seminar, May 2021, Hosted by Glenn Radice, Brown University
- ✓ Invited seminar, December 2020, Hosted by Prof Hinji, Osaka University
- ✓ Invited seminar Japanese Society of Cell Biology, December 2020, Japan - Online
- ✓ Invited seminar, July 2019, Hosted by Prof. A. Cavalcanti, Max Planck Institute, Heidelberg, Germany
- ✓ Invited seminar, February 2019, Yale-NUS, Singapore.
- ✓ Invited talk at Seminarios de departamento de Biología Celular y Molecular, March 2019, Pontificia Universidad Católica de Chile, Santiago de Chile
- ✓ Invited talk at Workshop DF y IIBM, June 2018, Pontificia Universidad Católica de Chile, Santiago de Chile
- ✓ Invited talk at SMART (Singapore MIT alliance), hosted by Prof K. Van Vliet, January 2018, Singapore
- ✓ Invited speaker at the 3rd International Conference on Mechanobiology (ISMB2017), Dec 2017, Singapore.
- ✓ Invited speaker at Superresolution Microscopy Workshop 2017 (SRM 2017), Nov 2017, Singapore
- ✓ Invited talk hosted by Prof P. Dietl, Professor of Physiology, Chair Institute of General Physiology, University of Ulm. November 2016 Ulm, Germany.

Membership of international scientific advisory boards

- ✓ Editorial board member of Scientific Report (<https://www.nature.com/srep/about/editors#cellbiology>)
- ✓ Editorial board member of Mechanobiology Journal (<http://www.bendola.com/journals/mbj/editors/>)
- ✓ Editorial board member of Cell Communication and Adhesion Journal (<http://www.tandfonline.com/toc/icac20/current>)
- ✓ ASCB member
- ✓ SBCCH member

Committees:

- ✓ Member of UMA (Unidad de Microscopia avanzada: Unit of advanced microscopy) Pontificia Universidad Católica de Chile.

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Public and media:

- ✓ Interviewed by the prime time scientific and cultural program **Superquark** hosted by Piero Angela. Show was broadcasted on RAI1 (Italian national TV) the 3rd July 2014 (2.802.000 viewers; 14,21% share).