



Chiara Arrigoni

PERSONAL INFORMATION

Name: Chiara Arrigoni

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SUMMARY

She is currently a Post-doctoral Researcher at the Cell and Tissue Engineering Lab and at the Regenerative Medicine Technologies Laboratory, EOC (Lugano – Switzerland). She received her Master degree in biomedical engineering and her PhD in bioengineering at Politecnico di Milano, with a period as a visiting PhD student at the Laboratoire de Biomatériaux et Bioing gnierie, Universit  Laval, Quebec, CA. During her post-doc at Mario Negri Institute of Pharmacological Research, under the supervision of prof. Andrea Remuzzi, she worked in the field of vascular tissue engineering, designing and exploiting flow perfusion bioreactors. Her main research focus is the engineering of vascularized musculoskeletal tissues at different scales, to be used either as tissue substitutes or as innovative 3D in vitro models. In particular, she investigates the role of vascularized microenvironment in the mechanisms underlying the metastatic processes.

SKILLS

During her research activities she acquired different technical skills, ranging from engineering competences such as the design and validation of devices for cell and tissue culture to more biological skills such as cell and tissue culture techniques for adult and progenitor cells and biochemical, histological and imaging analyses. Furthermore she coordinated the experimental work of different research projects in the field of vascular and bone tissue engineering and supervised master and doctoral students work.

PROFESSIONAL EXPERIENCE

- 01-11-2010- IRCCS Research Hospital Galeazzi Orthopedic Institute, Cell and Tissue Engineering Laboratory, Milan, Italy. Post-doctoral researcher.
- 01-10-2016- Regionale di Lugano, Unit  di Traumatologia e Ortopedia, Regenerative Medicine Technologies Lab, Lugano Switzerland. Post-doctoral researcher.
- 2009-2010 European Institute of Oncology, Head & Neck surgery department, Milan, Italy. Data Manager.
- 2006-2009 Mario Negri Institute for Pharmacological Research, Bioengineering department, Bergamo, Italy. Post-doctoral fellow.
- 2004 Laval University, Biomaterials and bioengineering Laboratory, Quebec, Canada. Visiting PhD student.
- 2003-2006 Politecnico di Milano, Bioengineering department, Milan, Italy. PhD student.
- 2002-2003 Mario Negri Institute for Pharmacological Research, Bioengineering department, Bergamo, Italy. Research fellow.

MENTORING EXPERIENCE

1 PhD Student in Biotechnology (Università Milano Bicocca, Milan, IT)

1 PhD Student in Bioengineering (Politecnico di Milano, Milan, IT)

8 Master Students in Bioengineering (Politecnico di Milano, Milan, IT)

EDUCATION

2006 Doctorate (PhD), Bioengineering. Bioengineering Dept. Politecnico di Milano, Italy.

2002 M.Sc (Research) in Bioengineering, Bioengineering Dept. Politecnico di Milano, Italy.

COLLABORATION IN FUNDED PROJECTS AS CO-INVESTIGATOR:

- 2015-2018 US Department of Defense, Breast Cancer Breakthrough Award on “Bone tropism of breast cancer metastases: dissecting the role of endothelial adhesion molecules through human organotypic vascularized microfluidic 3D models”.
- 2014-2017 Cariplo Foundation, “Self Assembled Monolayer coatings for lab-on-chip cell Sorting via Aptamer- Mediated reversible cellular adhesion”, Co-PI.
- 2013-2016 Cariplo Foundation, “Smart hydrogel systems for generation of contractile cardiac organoids”.
- 2010-2013 Regione Lombardia funded project (ATP 2009) “Industrializzazione e validazione preclinica di una piattaforma tecnologica per applicazioni cliniche di medicina rigenerativa”
- 2007-2009 Project funded by Cariplo Foundation “Protesi vascolari in fibrina elettrofilata per le rigenerazione in vivo di arterie di piccolo calibro”
- 2004 -2006 Project funded by European Community FP6-UE-STEPS: “A system approach to tissue engineering products and processes”
- 2002-2006 Italian Ministry of Health funded project, (FIRB): “Impiego delle tecniche di ingegneria tissutale nello sviluppo di protesi vascolari cellularizzate”

AWARDS AND HONORS

2002 Paolo Mancini award for the best master thesis in bioengineering

PEER-REVIEWED PUBLICATIONS:

1. Bianchi E, Piergiovanni M, **Arrigoni C**, Fukuda J, Gautieri A, Moretti M, Dubini G. Herringbone-like hydrodynamic structures in microchannels: A CFD model to evaluate the enhancement of surface binding. *Med Eng Phys.* 2017 Oct;48:62-67.
2. **Arrigoni C**, Gilardi M, Bersini S, Candrian C, Moretti M. Bioprinting and Organ-on-Chip Applications Towards Personalized Medicine for Bone Diseases. *Stem Cell Rev.* 2017 Jun;13(3):407-417. doi: 10.1007/s12015-017-9741-5. PubMed PMID:28589446.
3. Talò G, Turrisi C, **Arrigoni C**, Recordati C, Gerges I, Tamplenizza M, Cappelluti A, Riboldi SA, Moretti M. Industrialization of a perfusion bioreactor: prime example of a non-straightforward process. *J Tissue Eng Regen Med.* 2017 May 16.
4. Enomoto J, Kageyama T, Osaki T, Bonalumi F, Marchese F, Gautieri A, Bianchi E, Dubini G, **Arrigoni C**, Moretti M, Fukuda J. Catch-and-Release of Target Cells Using Aptamer-Conjugated Electroactive

- Zwitterionic Oligopeptide SAM. *Sci Rep.* 2017 Mar 7;7:43375. doi: 10.1038/srep43375. PubMed PMID: 28266533; PubMed Central PMCID: PMC5339905.
5. **Arrigoni C**, Bersini S, Gilardi M, Moretti M. In Vitro Co-Culture Models of Breast Cancer Metastatic Progression towards Bone. *Int J Mol Sci.* 2016 Aug 25;17(9). pii: E1405. doi: 10.3390/ijms17091405. Review. PubMed PMID: 27571063; PubMed Central PMCID: PMC5037685.
 6. Raimondi MT, Bertoldi S, Caddeo S, Farè S, **Arrigoni C**, Moretti M. The effect of polyurethane scaffold surface treatments on the adhesion of chondrocytes subjected to interstitial perfusion culture *Tissue Engineering and Regenerative Medicine* August 2016, Volume 13, Issue 4, pp 364–374
 7. **Arrigoni C**, Bongio M, Talò G, Bersini S, Enomoto J, Fukuda J, Moretti M. Rational Design of Prevascularized Large 3D Tissue Constructs Using Computational Simulations and Biofabrication of Geometrically Controlled Microvessels. *Adv Healthc Mater.* 2016 Jul;5(13):1617-26. doi: 10.1002/adhm.201500958. Epub 2016 May 18. PubMed PMID: 27191352.
 8. I. Gerges, M. Tamplenizza, S. Lopa, C. Recordati, F. Martello, A. Tocchio, L. Ricotti, **Arrigoni C**, P. Milani, M. Moretti & C. Lenardi Creep-resistant dextran-based polyurethane foam as a candidate scaffold for bone tissue engineering: Synthesis, chemico-physical characterization, and in vitro and in vivo biocompatibility *International Journal of Polymeric Materials and Polymeric Biomaterials* Vol. 65 , Iss. 14,2016
 9. Bersini S, **Arrigoni C**, Lopa S, Bongio M, Martin I, Moretti M. Engineered miniaturized models of musculoskeletal diseases. *Drug Discov Today.* 2016 Sep;21(9):1429-36. doi: 10.1016/j.drudis.2016.04.015. Epub 2016 Apr 28. Review. PubMed PMID: 27132520.
 10. Bersini S, Gilardi M, **Arrigoni C**, Talò G, Zamai M, Zagra L, Caiolfa V, Moretti M. Human in vitro 3D co-culture model to engineer vascularized bone-mimicking tissues combining computational tools and statistical experimental approach. *Biomaterials.* 2016 Jan;76:157-72. doi: 10.1016/j.biomaterials.2015.10.057. Epub 2015 Oct 24. PubMed PMID: 26524536.
 11. **Arrigoni C**, De Luca P, Gilardi M, Previdi S, Brogginini M, Moretti M. Direct but not indirect co-culture with osteogenically differentiated human bone marrow stromal cells increases RANKL/OPG ratio in human breast cancer cells generating bone metastases. *Mol Cancer.* 2014 Oct 21;13:238. doi: 10.1186/1476-4598-13-238. PubMed PMID: 25335447; PubMed Central PMCID: PMC4213507.
 12. Bersini S, Jeon JS, Dubini G, **Arrigoni C**, Chung S, Charest JL, Moretti M, Kamm RD. A microfluidic 3D in vitro model for specificity of breast cancer metastasis to bone. *Biomaterials.* 2014 Mar;35(8):2454-61. doi: 10.1016/j.biomaterials.2013.11.050. Epub 2013 Dec 31. PubMed PMID: 24388382; PubMed Central PMCID: PMC3905838.
 13. Laganà M, **Arrigoni C**, Lopa S, Sansone V, Zagra L, Moretti M, Raimondi MT. Characterization of articular chondrocytes isolated from 211 osteoarthritic patients. *Cell Tissue Bank.* 2014 Mar;15(1):59-66. doi: 10.1007/s10561-013-9371-3. Epub 2013 Apr 3. PubMed PMID: 23549979.
 14. Tredici P, Grosso E, Gibelli B, Massaro MA, **Arrigoni C**, Tradati N. Identification of patients at high risk for hypocalcemia after total thyroidectomy. *Acta Otorhinolaryngol Ital.* 2011 Jun;31(3):144-8. PubMed PMID: 22064813; PubMed Central PMCID: PMC3185817.
 15. **Arrigoni C**, Chittò A, Mantero S, Remuzzi A. Rotating versus perfusion bioreactor for the culture of engineered vascular constructs based on hyaluronic acid. *Biotechnol Bioeng.* 2008 Aug 1;100(5):988-97. doi: 10.1002/bit.21828. PubMed PMID: 18383121.
 16. **Arrigoni C**, Camozzi D, Remuzzi A. Vascular tissue engineering. *Cell Transplant.* 2006;15 Suppl 1:S119-25. Review. PubMed PMID: 16826804.

17. **Arrigoni C**, Camozzi D, Imberti B, Mantero S, Remuzzi A. The effect of sodium ascorbate on the mechanical properties of hyaluronan-based vascular constructs. *Biomaterials*. 2006 Feb;27(4):623-30. Epub 2005 Jul 26. PubMed PMID: 16048730.

CONFERENCE PROCEEDINGS (SELECTED):

1. E Bianchi, **C Arrigoni**, M Piergiovanni, M De Gennaro, P Roselli, J Enomoto, J Fukuda, M Moretti, G Dubini. Rare cells capturing in microchannels: hydrodynamic structures combined with aptamer binding to improve microfluidic cell selection. Poster presentation at Tissue Engineering Regenerative Medicine International Society (TERMIS) - EU Congress, Davos, CH, 26-30 June 2017.
2. Bersini S, **Arrigoni C**, Gilardi M, Talò G, Lopa S, Bongio M, Vanoni M, Dubini G, Kamm RD, Moretti M Advanced 3D vascularized in vitro models of human bone and muscle to study tumor cell extravasation. Oral presentation at Tissue Sciences congress, Singapore, 7-10 September 2017.
3. Bersini S, Gilardi M, **Arrigoni C**, Lopa S, Bongio M, Talò G, Vanoni M, Kamm RD, Moretti M 3D Micro-scale human models of vascularized organ-specific environments to study cancer cell extravasation. Poster presentation at: Goodbye Flat Biology: Models, Mechanisms and Microenvironment, Berlin, 02-05 October 2016.
4. M. Bongio, **C. Arrigoni**, G. Talò, S. Bersini, J. Enomoto, J. Fukuda, M. Moretti. Geometrically Controlled Micro-Vascularized Constructs based on Electrochemical Transfer of Endothelial Monolayer, 2015 Tissue Engineering Regenerative Medicine International Society (TERMIS) - World Congress in Tissue Engineering - part A, September 2015, 21(S1): S-178
5. S Bersini, J Jeon, M Gilardi, **C Arrigoni**, G Talò, V Caiolfa, RD Kamm, M Moretti. Micro and meso-scale human vascularized organ-specific models to study cancer cell extravasation, [Oral presentation at Biofabrication, Utrecht, NL, 7-11 November 2015].
6. Jeon J, Bersini S, Dubini G, **Arrigoni C**, Moretti M, Kamm RD Extravasation of breast cancer cells to a bone-cell conditioned microenvironment in functional 3D microvascular networks generated by vasculogenesis in a microfluidic system. AACR Special Conference on Cellular Heterogeneity in the Tumor Microenvironment at San Diego, CA, Feb 26-Mar 01, 2014. In *Cancer Research*, Jan 2015; 75(S1): B23
7. Bersini S, **Arrigoni C**, Jeon JS, Kamm RD, Moretti M, Micro-vascularized organ-specific 3D models for cancer metastases, 6th European Conference of the International Federation for Medical and Biological Engineering [Oral Presentation at Dubrovnik, Croatia, September 7-11, 2014].
8. Turrisi C, Weber D, Moretti M, **Arrigoni C**, Talò G, Mantero S and Riboldi SA, Industrialization of tissue engineering bioreactor technologies: the OPB (Oscillating Perfusion Bioreactor) case study, Termis EU 2014 [Oral Presentation at Genova, Italy, June 10-13, 2014]
9. Turrisi C, **Arrigoni C**, Talò G, Recordati C, Lovati A and Moretti M, Industrialized Oscillating Perfusion Bioreactor for bone tissue engineering, *Journal Of Tissue Engineering And Regenerative Medicine*, 2014 8(S1): 484
10. Bersini S, Jeon JS, Dubini G, **Arrigoni C**, Moretti M, Kamm RD, A microfluidic model for breast cancer metastases to bone, *Journal Of Tissue Engineering And Regenerative Medicine*, 2014 8(S1): 203
11. Turrisi C, Weber D, Moretti M, **Arrigoni C**, Talò G, Mantero S and Riboldi SA, Industrialization of tissue engineering bioreactor technologies: the OPB (Oscillating Perfusion Bioreactor) case study, *Journal Of Tissue Engineering And Regenerative Medicine*, 2014 8(S1): 148

12. Bersini S, Jeon JS, Dubini G, **Arrigoni C**, Moretti M, Kamm RD, A microfluidic model for breast cancer metastases to bone, Termis EU 2014 [Oral Presentation at Genova, Italy, June 10-13, 2014]
13. **C. Arrigoni**, M. Pierro, N. Mochizuki, N. Sadr, T. Kakegawa, J. Fukuda, M. Moretti, Biofabrication And Dynamic Culture Of Micro-Vascularized Constructs Based On Fibrin And MSCs For Bone Tissue Engineering, 2013 Tissue Engineering Regenerative Medicine International Society (TERMIS) - EU chapter [Oral presentation at Istanbul, Turkey, June 2013]
14. S. Bersini, J. Jeon, **C. Arrigoni**, G. Dubini, M. Moretti, R. Kamm, A microfluidic model for cancer metastases to bone, 2013 European Society of Biomechanics (ESB) [Oral Presentation at Patras, Greece, August 2013]
15. J. Jeon, S. Bersini, **C. Arrigoni**, G. Dubini, M. Moretti, R. Kamm, In vitro model for tumor cell extravasation to bone, 2013 Biomedical Engineering Society (BMES) [Oral Presentation Seattle, USA, September 2013]
16. Bersini S, Jeon JS, Dubini G, **Arrigoni C**, Moretti M, Kamm RD, An organ-specific microfluidic model for breast cancer cell extravasation and metastases to bone, 7th World Congress of Biomechanics [Oral Presentation at Boston, USA, July 6-11, 2014]
17. **C. Arrigoni**, M. Pierro, T. Kakegawa, I. Scibelli, N. Sadr, N. Mochizuki, J. Fukuda, M. Moretti, Micro-vascularized MSC-loaded fibrin constructs cultured in bioreactor for bone tissue engineering, 2012 International Conference on Biofabrication [Oral presentation at Manchester, October 2012]
18. **C. Arrigoni**, A. Marcotto, C. Turrisi, G. Talò, S. Mantero, M. Moretti Perfusion seeding of porous scaffolds: a bioreactor-based procedure suitable for the establishment of uniform 3D-structured co-cultures, 2012 Tissue Engineering Regenerative Medicine International Society (TERMIS) - World Congress in Journal of Tissue Engineering and Regenerative Medicine, 6(S1) p. 345
19. C. Turrisi, G. Talò, **C. Arrigoni**, M. Moretti, Automated, online, real-time monitoring of culture parameters in multiple independent chambers of a perfusion bioreactor, 2011 Tissue Engineering Regenerative Medicine International Society (TERMIS) - EU chapter, Histology and Histopathology, 26(S1) pag. 67