

PERSONAL INFORMATION

ROBERTO GAETANI

POSITION

University Researcher

WORK EXPERIENCE

Dec 2018-present

Researcher/ RTDA

Department of Molecular Medicine, University of Rome "Sapienza", Rome, IT.

June 2016-June 2022

Research Scientist. Department of Bioengineering, Sanford Consortium for Regenerative Medicine, University of California San Diego. San Diego (CA), US.

April 2015-present

Instructor of COSMOS summer program. Co-director COSMOS cluster 8: Tissue Engineering and Regenerative Medicine.

Jacobs School of Engineering, University of California, San Diego. San Diego (CA), US.

June 2015- June 2019

Co-Director of NSF-Research Experience for Undergraduate students in Engineered Materials for Tissue Engineering and Drug Delivery.

Jacobs School of Engineering, University of California, San Diego, San Diego (CA), US.

July 2013-March 2015

Post-Doctoral fellow

Dep. of Bioengineering, Sanford Consortium for Regenerative Medicine, University of California San Diego, San Diego (CA), US.

September 2012- August 2015

Post-Doctoral fellow

Dep. of Molecular Medicine, University of Rome "Sapienza", Rome, IT.

Mar 2009-Jun 2013

Post-Doctoral fellow

Dep. of Experimental Cardiology, University Medical Center Utrecht, Utrecht, the Netherlands.

Nov 2008- Feb 2009

Fellow student

Dept. of Experimental Medicine; Sapienza University of Rome, Rome (IT).

Business or sector: Research in Regenerative Medicine, Biomaterials, and Tissue Engineering

EDUCATION AND TRAINING

27/01/2009

PhD in Pasteurian Science

Dept. of Experimental Medicine; Sapienza University of Rome, Rome (IT).

29/10/2005

Master degree, MS, 110/110 *cum laude* in Medical and Molecular Biotechnology,

Dept. of Experimental Medicine; Sapienza University of Rome, Rome (IT).

17/12/2003

Bachelor degree, BS, 110/110 *cum laude* in Biotechnology,

Department of Histology and Medical Embryology; Sapienza University of Rome, Rome (IT).

04/07/2000 Scientific High School degree, 100/100
 Liceo Scientifico Q. Ennio, Gallipoli (LE), IT

Mother tongue(s) Italian

Other language(s)	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C1
French	A2	A2	A1	A1	A1
Spanish	B2	A2	B1	B1	A1

Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2 Proficient user

Digital skills

SELF-ASSESSMENT				
Information processing	Communication	Content creation	Safety	Problem solving
Proficient	Proficient	Independent	Independent	Independent

Levels: Basic user - Independent user - Proficient user

ADDITIONAL INFORMATION



Grant and Fellow Support

2023: Molecular processes underlying hypertrophy in icefish can be translated in cardiac cultures from zebrafish to human cardiac-iPSCs and organoids Programma Nazionale di Ricerca in Antartide - Bando PNRA 2022. Responsabile scientifico unità Sapienza.

2023: Role of 22q11.2 deletion syndrome (22q11DS) haploinsufficiency in driving cardiac extracellular matrix changes and mechanical sequelae using a Tbx1 mutant mice model: mechanistic insight and detection of potential therapeutic targets. Prin 2022 PNRR. Responsabile Scientifico, Prof.ssa Elisa Messina. Componente unità di ricerca.

2022: A translational approach to reduce anthracycline-induced cardiotoxicity: the role of formyl peptide receptor-1 and toll-like receptor 3 modulation. Bando Ateneo. Numero protocollo: RG1221816BC8E766. Componente. Responsabile: SCARRETTA Sebastiano.

2021: Evaluation of gelatin-based cryo-hydrogels for cardiac tissue engineering applications. Bando Ateneo. Numero protocollo: RM12117A8B470BA7. Responsabile scientifico.

2020: Evaluation of Silicon Nanowires for controlled drug release in a 3D model of healthy and pathological lung tissue. Numero protocollo: RM120172B7F71B4B. Responsabile.

2020: Class III Biological Safety Cabinet as laboratory equipment for handling biological threat agents and monitoring host immune response to emerging infectious agents. Bando Ateneo Medie attrezzature. Numero protocollo: MA120172B4A32AE4. Componente. Responsabile: PIERANGELI Alessandra.

2019-2021: Horizon 2020; IMPLICATIONS OF MEDICAL LOW DOSE RADIATION EXPOSURE- MEDIRAD; Grant number: 755523. Consortium Partner.

2019-2021: Research Experience for Undergraduate; National Science Foundation; USA. Grant. N. 1559781

2017-2019: Human islets Research Network-NHI grant; Young investigator pilot grant. Evaluation of human islets extracellular matrix components for tissue engineering applications. Study number BS358

2016-2019: Human islets Research Network-NHI grant; A Vascularized 3D Biomimetic for Islet Function and Physiology. Consortium Partner; grant n. UC4 DK104196

2012: Transatlantic career Development grant; Leduq Foundation; Paris.

2009-2011: Post-Doc career development award; Pasteur Institute- Cenci Bolognetti Foundation, Rome IT, Italy.

Scientific Reviewer/ Editorial board:

2020- present: Topic Editorial Board Member of International Journal of Molecular Sciences

2018: Guest Editor of the special issue "Evaluating biomaterial and implanted devices" for Drug Discovery Today: Disease Model.

2018: Guest Editor of the special issue "Stem Cells as Regenerative Tools and Biological Models for the Cardiovascular System" for Stem Cell International Journal.

Reviewer: Cardiovascular research (Card Res); Journal of the American College of Cardiology (JACC); Journal of Cellular and Molecular Medicine (JCMM); Biomaterials; Tissue Engineering; Advanced Biomaterials; Stem Cells International, Acta Biomaterialia

Memberships (past and current)

American Heart Association (AHA); European Society of Cardiology (ESC); International Society for Heart Research (ISHR); Tissue engineering and Regenerative Medicine international Society (TERMIS); Biomedical Engineering Society (BMES).

- Academic activity**
- 2019- present. Professor of Molecular and Cellular Pathology, Master in Pharmaceutical Biotechnology, University of Rome Sapienza.
- 2017- 2019: Instructor UC San Diego Bioengineering Graduate Program. Course BENG241A: Tissue Engineering and Regenerative Medicine Foundation; course BENG277: Tissue Engineering laboratory.
- 2016- 2019. Co-Director of NSF-Research Experience for Undergraduate students in Engineered Materials for Tissue Engineering and Drug Delivery. University of California, San Diego.
- 2015- present. California State Summer School for Mathematics and Science [COSMOS] teacher. Tissue engineering and regenerative medicine cluster. University of California, San Diego.
- 2013: Teaching assistant, undergraduate program, Faculty of Life Science, University of Utrecht. Cardiac Tissue Engineering module; Cardiovascular regenerative Medicine module.
- International Conference invited speaker**
- 10/12/2019, Utrecht (The Netherlands): New approaches in cardiac tissue modelling.
- 12/12/2016, San Diego (USA), TERMIS-AM conference; Biomaterial-based strategies for exosome delivery.
- 23/04/2016, San Diego (USA), BMES Translational Medicine Day 2016; Biomaterials and Tissue Engineering.
- 25/01/2013, Les Diablerets (Switzerland), HFA Winter Research Meeting on Translational Research. "Tissue printed Cardiac Progenitor Cells improve myocardial function in a mouse model of MI."
- 8/06/2011, Granada (Spain); Tissue engineering and Regenerative Medicine international Society (TERMIS). "Tissue Printing technology for Cardiac regeneration".
- 11/05/2011, Brussels (Belgium); Heart Failure Association Cardiac Stem Cell Workshop. "Cardiospheres for Cardiac Regeneration".
- 25/03/2010, Bucharest (Romania): Federation of the European Academies of Medicine (FEAM). "Cardiac Stem and Tissue engineering for Myocardial regeneration".
- 9/02/2009, Utrecht (The Netherlands): Regenerative Medicine Symposium. "Cardiac Stem cells isolation as a therapeutic tool for heart regeneration.
- 16/04/2009, Roma Monteporzio Catone (Italia): I.S.P.E.S.L symposium on "Magnetic Field and Biological system". Cardiac Stem Cells and Electromagnetic fields.
- Current research interests**
- Engineering 3D cardiac tissues by cardiac-derived ECM and iPSC- cardiomyocytes; evaluation of the effects of different extracellular molecules on iPSC- cardiomyocytes differentiation and maturation. Development of new approaches of 3D cellular cluster and organoid engineering by ECM molecules incorporation.
- Evaluation of low dose ionizing breast cancer radiation on the cardiovascular system.
- Development of tissue-derived decellularized biomaterials from cardiac and pancreatic tissue for tissue engineering and regenerative medicine.
- Role of Tbx1 in the cardiac stroma compartment.
- Development of a 3D micro-vascularized pancreatic tissue for diabetes tissue engineering and research model.
- Development of 3D cancer models for the evaluation of molecular pathways involved in malignancy.
- National and International collaboration**
- Department of Cardiology, University Medical Center (UMC), Utrecht, Netherlands. Prof. J. Sluijter
- Department of Bioengineering, University of California, San Diego, USA. Prof. Karen Christman.
 - Stanford Cardiovascular Institute, Stanford University, San Francisco, USA. Prof. Mark Mercola
 - Molecular Medicine Institute, University of Lisbon, Lisbon, PT. Prof. Susana Costantino
 - Dep. Medical Surgical Sciences and Biotechnologies, "La Sapienza" University of Rome, Italy. Prof.ssa Isotta Chimenti.

- Dep. of Electronic Engineering, Sapienza University of Rome. Prof. Fabrizio Palma.
- Dep of Molecular Medicine, "La Sapienza" University of Rome, Prof.ssa Cristina Cerboni e Prof.ssa Alessandra Soriani.
- Dep. of Drug Chemistry and Technologies, Sapienza University of Rome, Prof.ssa A. Casadei, Prof. Patrizia Paolicelli.
- PolitoBIOMed Lab, Dep. of Mechanical and Aerospace Engineering, Politecnico di Torino, Turin, Italy. Prof. A. Morbiducci
- Tissue Engineering Research Unit, "Centro Cardiologico Monzino", IRCCS, Milan, Italy. Prof. Maurizio Pesce.
- CNR Napoli, Prof. A Baldini and Dr.ssa D. Alfano.

Bibliometrics (as of November 2023):

Author ID: 15831924500 (Scopus)

<https://www.scopus.com/authid/detail.uri?authorId=15831924500>

<https://orcid.org/0000-0001-5667-5152>

<https://www.ncbi.nlm.nih.gov/myncbi/1jatja3brjv5s/bibliography/public/>

Total citations: 1880 (Scopus); 2647 (Google scholar).

h-index: 24 (Scopus); 24 (Google scholar)

Publications

- 1) Chimenti I, **Gaetani R**, Pagano F. The cardiac stroma in homeostasis and disease. Editorial. Front Cardiovasc Med. 2023 Jul 10;10:1248750
- 2) **Gaetani R**, Chimenti I. 3D Cultures for Modelling the Microenvironment: Current Research Trends and Applications. Int J Mol Sci. 2023 Jul 5;24(13):11109
- 3) Di Muzio L.;Sergi C.;Carriero V. C.;Adrover A.;Messina E.;**Gaetani R.**;Petalito S.;Casadei M. A.;Paolicelli P. Gelatin-based spongy and compressive resistant cryogels with shape recovery ability as ideal scaffolds to support cell adhesion for tissue regeneration. Reactive and Functional Polymers. Volume 189, August 2023
- 4) **Gaetani R**, Derevyanchuk Y, Notargiacomo A, Pea M, Renzi M, Messina E, Palma F. Biocompatibility and Connectivity of Semiconductor Nanostructures for Cardiac Tissue Engineering Applications. Bioengineering (Basel). 2022 Oct 27;9(11):621.
- 5) Picchio V, Floris E, Derevyanchuk Y, Cozzolino C, Messina E, Pagano F, Chimenti I, **Gaetani R**. Multicellular 3D Models for the Study of Cardiac Fibrosis. Int J Mol Sci. 2022 Oct 1;23(19):11642.
- 6) Diaz M, Tran E, Spang M, Wang R, **Gaetani R**, Luo CG, Braden R, Hill RC, Hansen KC, DeMaria AN, Christman KL, Injectable Myocardial Matrix Hydrogel Mitigates Negative Left Ventricular Remodeling in a Chronic Myocardial Infarction Model. JACC Basic Transl Sci. 2021 Mar 10;6(4):350-361
- 7) Pagliarosi O, Picchio V, Chimenti I, Messina E, **Gaetani R**. Building an Artificial Cardiac Microenvironment: A Focus on the Extracellular Matrix. Front Cell Dev Biol. Sep 4 2020; 8: 559032
- 8) **Gaetani R**, Eric Adriano Zizzi, Marco Agostino Deriu, Umberto Morbiducci, Maurizio Pesce, Elisa Messina. When stiffness matters: mechanosensing in heart development and disease. Front Cell Dev Biol. 25 May 2020; 8:334.

- 9) Carlini AS, **Gaetani R**, Braden RL, Luo C, Christman KL, Gianneschi NC. Enzyme-responsive progelator cyclic peptides for minimally invasive delivery to the heart post-myocardial infarction. *Nat Commun.* 2019 Apr 15;10(1):1735.
- 10) **Gaetani R**, Aouad S, Demaddalena LL, Straessle H, Dzieciatkowska M, Wortham M, Bender HR, Nguyen-Ngoc KV, Schmid-Schoenbein GW, George SC, Hughes CCW, Sander M, Hansen KC, Christman KL. Evaluation of different decellularization protocols on the generation of pancreas-derived hydrogels. *Tissue Eng Part C Methods.* 2018 Nov 6.
- 11) Bejleri D, Streeter BW, Nachlas ALY, Brown ME, **Gaetani R**, Christman KL, Davis ME. A Bioprinted Cardiac Patch Composed of Cardiac-Specific Extracellular Matrix and Progenitor Cells for Heart Repair. *Adv Healthc Mater.* 2018 Dec;7(23)
- 12) Hernandez MJ, **Gaetani R**, Pieters VM, Ng NW, Chang AE, Martin TR, van Ingen E, Mol EA, Sluijter JPG, Christman KL. Decellularized Extracellular Matrix Hydrogels as a Delivery Platform for MicroRNA and Extracellular Vesicle Therapeutics. *Adv Ther (Weinh).* 2018 Jul;1(3)
- 13) **Gaetani R**, Yin C, Srikumar N, Braden R, Doevendans PA, Sluijter JP, Christman KL. Cardiac derived extracellular matrix enhances cardiogenic properties of human cardiac progenitor cells. *Cell Transplant.* 2015 Nov 16.
- 14) Feyen DA, **Gaetani R**, Doevendans PA, Sluijter JP. Stem-cell based therapy; improving myocardial cell delivery. *Advanced Drug Delivery Reviews.* 2016 Nov 15;106(Pt A):104-115
- 15) Wassenaar J, **Gaetani R**, Garcia J, Braden R, Luo C, Huang D, DeMaria A, Omens J, Christman KL. Transcriptional and Histological Evidence for the Mechanisms Underlying the Functional Benefits of a Myocardial Matrix Hydrogel for Post-Myocardial Infarction Treatment. *J Am Coll Cardiol.* 2016 Mar 8;67(9):1074-86.
- 16) Feyen DA, **Gaetani R**, Deddens J, van Keulen D, van Opbergen C, Poldervaart M, Alblas J, Chamuleau S, van Laake LW, Doevendans PA, Sluijter JP. Gelatin Microspheres as Vehicle for Cardiac Progenitor Cells Delivery to the Myocardium. *Adv Healthc Mater.* 2016 Feb 23.
- 17) **Gaetani R**, Feyen DA, Verhage V, Slaats R, Messina E, Christman KL, Giacomello A, Doevendans PA, Sluijter JP. Epicardial application of cardiac progenitor cells in a 3D-printed gelatin/hyaluronic acid patch preserves cardiac function after myocardial infarction. *Biomaterials.* 2015 Aug; 61:339-48.
- 18) **Gaetani R**, Feyen DA, Doevendans PA, Gremmels H, Forte E, Fledderus JO, Ramjankhan FZ, Messina E, Sussman MA, Giacomello A, Sluijter JP. Different types of cultured human adult Cardiac Progenitor Cells have a high degree of transcriptome similarity. *J Cell Mol Med.* 2014 Nov;18(11):2147-51.
- 19) Johnson T., DeQuach J., **Gaetani R.**, Ungerleider J., Elhag D., Nigam V., Behfard A. and Christman KL. Human versus porcine tissue sourcing for an injectable myocardial matrix hydrogel. *Biomater. Sci.*; 2: 735-44 2014.
- 20) Hohl M, Ardehali H, Azuaje F, Breckenridge R, Doehner W, Eaton P, Ehret G, Fujita T, **Gaetani R**, Giacca M, Leite-Moreira A, Linke W, Linz D, Lyon A, Mamas AM, Orešič M, Papp Z, Pedrazzini T, Piepoli M, Prosser B, Rizzuto R, Tarone G, Tian R, van Craenenbroeck E, van Rooij E, Wai T, Weiss G, Maack C. Meeting highlights from the 2013 European Society of Cardiology Heart Failure Association Winter Meeting on Translational Heart Failure Research. *Eur J Heart Fail.* 2014 Jan;16(1):6-14.
- 21) **Gaetani R**, Doevendans PA, Metz CHG, Alblas J, Messina E, Giacomello A, Sluijter JPG. Cardiac tissue engineering using tissue printing technology and human Cardiac Progenitor Cells. *Biomaterials.* 2012 Feb; 33(6):1782-90.
- 22) Chimenti I, **Gaetani R**, Forte E, Angelini F, De Falco E, Zoccai GB, Messina E, Frati G, Giacomello A. Serum and supplement optimization for EU GMP-compliance in cardiospheres cell culture. *J Cell Mol Med.* 2014 Jan 20.

- 23) Feyen D, **Gaetani R**, Liu J, Noort W, Martens A, den Ouden K, Doevendans PA, Sluijter JP. Increasing short-term cardiomyocyte progenitor cell (CMPC) survival by necrostatin-1 did not further preserve cardiac function. *Cardiovasc Res*. 2013 Jul 1;99(1):83-91.
- 24) Koudstaal S, Jansen Of Lorkeers SJ, **Gaetani R**, Gho JM, van Slochteren FJ, Sluijter JP, Doevendans PA, Ellison GM, Chamuleau SA. Concise review: heart regeneration and the role of cardiac stem cells. *Stem Cells Transl Med*. 2013 Jun;2(6):434-43.
- 25) Chimenti I, **Gaetani R**, Barile L, Forte E, Ionta V, Angelini F, Frati G, Messina E, Giacomello A. Isolation and expansion of adult cardiac stem/progenitor cells in the form of cardiospheres from human cardiac biopsies and murine hearts. *Methods Mol Biol*. 2012;879: 327-38.
- 26) **Gaetani R**, Rizzitelli G, Chimenti I, Barile L, Forte E, Ionta V, Angelini F, Sluijter J.P.G., Dentini M, Messina E, Frati G. Cardiospheres and tissue engineering for myocardial regeneration: potential for clinical application. *J Cell Mol Med*. 2010 May;14(5):1071-7.
- 27) Fabrizi C, Angelini F, Chimenti I, Pompili E, Somma F, **Gaetani R**, Messina E, Fumagalli L, Giacomello A, Frati G. Thrombin and thrombin-derived peptides promote proliferation of cardiac progenitor cells in the form of cardiospheres without affecting their differentiation potential. *J Biol Regul Homeost Agents*. 2011 Apr-Jun;25(2 Suppl):S43-51.
- 28) Chimenti I, Rizzitelli G, **Gaetani R**, Angelini F, Ionta V, Forte E, Frati G, Schussler O, Barbetta A, Messina E, Dentini M, Giacomello A. Human cardiosphere-seeded gelatin and collagen scaffolds as cardiogenic engineered bioconstructs. *Biomaterials*. 2011 Dec; 32(35):9271-81.
- 29) **Gaetani R**, Barile L, Forte E, Chimenti I, Ionta V, Di Consiglio A, Miraldi F, Frati G, Messina E, Giacomello A. New perspectives to repair a broken heart. *Cardiovasc Hematol Agents Med Chem*. 2009 Apr;7(2):91-107.
- 30) **Gaetani R**, Ledda M, Barile L, Chimenti I, Forte E, De Carlo F, Messina E, Grimaldi S, Giacomello A, Lisi A. Differentiation of human cardiac stem cells exposed to Extremely Low Frequency. *Electromagnetic Fields. Cardiovasc Res*. 2009 Jun 1;82(3):411-20.
- 31) Chimenti I, **Gaetani R**, Barile L, Frati G, Messina E, Giacomello A. c-kit cardiac progenitor cells: what is their potential? *Proc Natl Acad Sci U S A*. 2009 Jul 14; 106(28):E78;
- 32) Forte E, Chimenti I, Barile L, **Gaetani R**, Angelini F, Ionta V, Messina E, Giacomello A. Cardiac Cell Therapy: The Next (Re)Generation. *Stem Cell Rev*. 2011 Nov;7(4):1018-30.
- 33) Barile L, Cerisoli F, Frati G, **Gaetani R**, Chimenti I, Forte E, Cassinelli L, Spinardi L, Altomare C, Kizana E, Giacomello A, Messina E, Ottolenghi S, Magli MC. Bone marrow-derived cells can acquire cardiac stem cells properties in damaged heart. *J Cell Mol Med*. 2011 Jan;15(1):63-71
- 34) Barile L, Chimenti I, **Gaetani R**, Forte E, Miraldi F, Frati G, Messina E, Giacomello A. Cardiac stem cells: isolation, expansion and experimental use for myocardial regeneration. *Nat Clin Pract Cardiovasc Med*. 2007 Feb;4 Suppl 1(S1):S9-S14.
- 35) Lisi A, Ledda M, De Carlo F, Pozzi D, Messina E, **Gaetani R**, Chimenti I, Barile L, Giacomello A, D'Emilia E, Giuliani L, Foletti A, Patti A, Vulcano A, Grimaldi S. Ion cyclotron resonance as a tool in regenerative medicine. *Electromagn Biol Med*. 2008;27(2):127-33.

Book Chapter

- 1) **Gaetani R**, Ungerleider J. and Christman KL. Acellular Injectable Biomaterials for Treating Cardiovascular Disease. Volume: Stem Cell and Gene Therapy for Cardiovascular Disease. September 2015.
- 2) **Gaetani R**, Doevendans P.A, Messina E, Sluijter J. P.G. Tissue Engineering For Cardiac Regeneration. Chapter Book; Elsevier Series in the framework of "Studies in Mechanobiology, Tissue Engineering and Biomaterials". 2011, Volume 6, 1-27.
- 3) Chimenti I, **Gaetani R**, Barile L, Forte E, Ionta V, Angelini F, Messina E and Giacomello A. Evidence for the existence of resident cardiac stem cells. Springer Science & Business Media series in the framework of Stem

Cell Biology and Regenerative Medicine. 2011, Volume: Regenerating the Heart Stem Cells and the Cardiovascular System, 131-149.

Data
12/12/2023

Firmato
Roberto Gaetani