

Curriculum Vitae

Raimon Sunyer, Ph.D.

(updated June 2024)

PERSONAL INFORMATION

Work address:

Facultat de Medicina,
Departament de Biomedicina
Universitat de Barcelona
C/ Casanova, 145, 5a planta, Ala Nord,
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Current positions (December 2022-present):

- Serra-Hùnter Assistant Professor

EDUCATION AND TRAINING

Education:

Ph.D. in Physics (*Excellent Cum Laude*). University of Barcelona, 22/7/2008. Title: “Contribution of active processes to the cytoskeleton dynamics of living cells”. Ph.D. supervisors: Prof. Daniel Navajas and Prof. Fèlix Ritort

B. Sc. in Physics, University of Barcelona, 1/03/2003

Postdoctoral training:

National Institutes of Health (NIH), Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), Bethesda, MD. Integrative Biophysics laboratory. Supervisor: Prof. Ralph Nossal/Dan Sackett (2010-2013)

Institute for the Bioengineering of Catalonia (IBEC), Barcelona, Spain. Integrative Cell and Tissue Dynamics laboratory. Supervisor: Prof. Xavier Trepat (2013-2019)

FIELDS OF INTEREST

Mechanobiology, Cytoskeleton, Cadherins, Cell Migration, Collective Cell Migration, Directed cell Migration, Durotaxis, Haptotaxis, Biomaterials

SUMMARY OF MY CV

After an undergraduate B.Sc. in physics, I carried out my Ph.D. at the University of Barcelona (UB) in cell mechanics and biophysics (Directors: Daniel Navajas and Felix Ritort, 2004-2008). Then I carried out post-doctoral research at the Integrative Cell Biophysics Laboratory at the National Institutes of Health (NIH, Bethesda, MD, Advisors: R. Nossal and D. Sackett, 2010-2013). I continued with a second postdoc at the Institute for Bioengineering of Catalonia (IBEC) under the supervision of X. Trepat (2013-2019). I established my independent research line in 2019 with a grant from the Young Researcher’s program (Spanish Ministry of Science, Innovation and Universities), a Ramon y Cajal Tenure Track fellowship and finally a Serra-Hùnter Tenure track position.

My group currently includes 4 Ph.D. and has successfully defended 1 doctoral thesis (see below). Our research focuses on how cells detect and respond to mechanical signals. We are particularly interested in how these signals trigger directed cell migration in a wide range of biological phenomena, from development to tumor growth and metastasis. To this end, we combine biophysical techniques such as traction force microscopy, micropatterning, microfluidics, hydrogel stiffness gradients and Atomic Force Microscopy with molecular biology, advanced optical

microscopy, and computational modelling. So far, this approach has provided several key contributions to the field which have led to the following findings (see below for a full list of my publications):

- The discovery of **collective durotaxis** (Sunyer et al., Science, 2016). In 2021, A. Shellard and R. Mayor found that collective durotaxis takes place *in vivo* during morphogenesis (Shellard & Mayor, *Nature*, 2021).
- The conditions that enable optimal collective durotaxis (Pallarés et al. Nature Physics, 2022).
- A robust technique to fabricate stiffness gradient hydrogels (Sunyer, et al, *PLoS ONE*, 2012)
- A microfluidic chip to create orthogonal gradients of chemical concentration and substrate stiffness (García et al, *Lab on a Chip*, 2015)
- How physical forces propagate at repulsive epithelial boundaries (P. Rodríguez-Franco et al., *Nature Materials*, 2017)

With respect to teaching, my experience began as a Ph.D. student when I taught for several academic years Biophysical laboratory sessions for the grade of Medicine and Biophysical problems for the grade of Biology. In 2018 I became a part-time Lecturer in the Department of Biomedicine (School of Medicine, University of Barcelona) where I taught at the grades of Medicine and Biomedical Engineering. Since I joined the Serra-Hunter program by the end of 2021, I had full teaching duties at the Department of Biomedicine. Apart from these teaching activities, I have regularly participated in evaluation committees of research projects at the level of Master and Ph.D.

RESEARCH ACTIVITIES

Affiliations in research institutions (including mentors and research topics)

2021-present	Assistant professor in the Serra-Hunter program. Catalan Government, University of Barcelona
2021-2021	Ramon y Cajal Tenure Track Fellow. Spanish Ministry of Science, Innovation and Universities (MICIU) <i>Topic:</i> Mechanobiology of directed cell migration driven by physical signals
2019-2021:	Senior Researcher. Young Researcher Program (“Jóvenes Investigadores”), Spanish Ministry of Science, Innovation and Universities (MICIU) <i>Topic:</i> Mechanical guidance of single cells and tissues
2016-2019:	Senior Postdoctoral Researcher. CIBER BIOINGENIERIA BIOMATERIALES Y NANOMEDICINA (CIBER-BBN), Barcelona, Spain (Mentor: Prof. X. Trepát) <i>Topic:</i> Fabrication of cadherin coated substrates for mechanobiology
2013-2016:	Postdoctoral Researcher. Institute for Bioengineering of Catalonia (IBEC), Barcelona, Spain (Mentor: Prof. X. Trepát) <i>Topic:</i> How single cells and tissues follow mechanical gradients (durotaxis)
2010-2013:	Postdoctoral Researcher. National Institutes of Health (NIH), Bethesda (MD), USA (Mentors: R. Nossal and D. Sackett) <i>Topic:</i> Development of stiffness gradient matrices to study mechanobiology
2009-2010	Researcher. CIBER ENFERMEDADES RESPIRATORIAS (CIBERES), Hospital Clínic, Barcelona, Spain
2005-2009:	Pre-doctoral researcher. Dept. of Physiological Sciences I, University of Barcelona, Spain (Mentors: D. Navajas and F. Ritort) <i>Topic:</i> Developing new tools to measure cytoskeleton mechanical properties

INTERNSHIPS

2017	INSTITUTE OF MATERIALS SCIENCE OF ARAGÓN (CSIC) JM de la Fuente Lab, Zaragoza, Spain Visiting Researcher (2 weeks). Topic: Developing matrices coated with E-cadherins Contact: Dr. Valeria Grazú/Prof. JM de la Fuente
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- 2013 **MAX PLANK INSTITUTE**
 Arancha del Campo lab, Mainz (Germany)
 Visiting Researcher (2 weeks)
 Topic: Developing an assay to combine photo-activable RGD with soft matrices to study collective cell migration
 Contact: Prof. Arancha del Campo
- 2006 **HARVARD UNIVERSITY**
 JJ Fredberg lab, Cambridge MA (USA)
 Visiting researcher (3 months)
 Topic: Developing an assay to measure forces of collective cell systems
 Mentor: Prof. JJ Fredberg
- 2004 **UNIVERSITAT POLITÈCNICA DE CATALUNYA**
 Centre Transferència Calor i Massa, Terrassa (Spain)
 Visiting Researcher (2 months)
 Topic: Numerical integration of Navier-Stokes equations
 Mentor: Dr. Kilian Claramunt
- 2003 **CNRS**
 Louis Neel Laboratoire, Grenoble (France)
 Visiting researcher (3 months)
 Topic: Monte-Carlo simulations of antiferromagnets systems with Dzyaloshinsky-Moriya interactions
 Mentors: Dr. Maged Elhajal and C. Lacroix

TECHNOLOGY TRANSFER EXPERIENCE

INNoVATE tech-transfer program: 1-year training on transferring technology developed in research to market
 Carey Business School, Johns Hopkins University, 2012 (Certificate)

Technology I developed obtained the funding from ERC-PoC program MICROGRADIENTPAGE (148,963€)
 (Principal investigator: X. Trepatri).

I helped to conceive, co-wrote the project and coordinate its implementation

SCIENCE OUTREACH ACTIVITIES

Popular Science articles:

P. Rodríguez-Franco, X. Trepatri and R. Sunyer. [Mecanobiología de los tejidos celulares](#). Investigación y Ciencia. (Scientific American, Spanish edition). June 2018

X. Trepatri and R. Sunyer. [Mechanobiology of collective cell systems](#). SBE Magazine January 2017 (Spanish Society of Biophysics)

Other outreach activities

Training of undergraduate students in summer (Parc Científic de Barcelona, 2016)

Participation in outreach activities to promote the scientific career to undergraduate students (Research4Talent, IBEC, 2016-2017)

Talks to explain what the Ph.D. is to undergraduate students (“*Encontres amb el Tercer Cicle*”, Physics Faculty, University of Barcelona, 2005)

FUNDING OBTAINED AS A PRINCIPAL INVESTIGATOR, COORDINATOR OR IMPLEMENTATION

- Consolidación Investigadora** (September 2024). **Title:** Study of the aberrant Mechanobiology of senescent fibroblasts in Idiopathic Pulmonary Fibrosis). **Affiliation institution:** University of Barcelona. **PI:** Raimon Sunyer. **Funding body:** Ministerio de Ciencia, Innovación y Universidades. **Reference:** CNS2022-135533. **Total amount:** 195,000€. **Funding period:** 2024-2025.
- Generación de Conocimiento** (September 2022). **Title:** Restoring the physiologic mechanobiology of plastic-cultured cells: implications for durotaxis (PhysioTaxis). **Affiliation institution:** University of Barcelona. **PI:** Raimon Sunyer & Jordi Otero. **Funding body:** Ministerio de Ciencia, Innovación y Universidades. **Reference:** PID2021-128674OB-I00. **Total amount:** 130,000€. **Funding period:** 2022-2025.
- Ramon y Cajal** Tenure Track fellowship (September 2020). **Title:** Mechanobiology of directed cell migration driven by physical signals. **Affiliation institution:** University of Barcelona. **PI:** Raimon Sunyer. **Funding body:** Ministerio de Ciencia, Innovación y Universidades. **Reference:** RYC2019-026721-I. **Total amount:** Full salary for 5 years + 40,000€ for research. **Funding period:** 2021-2026.
- Title:** Bio-compatible hydrogels with dynamically tunable stiffness to study mechanobiology of cells and tissues (DYNAGEL). **Affiliation institution:** Fundació Privada Institut de Bioenginyeria de Catalunya (IBEC). **PI:** Raimon Sunyer. **Funding body:** Ministerio de Ciencia, Innovación y Universidades. **Reference:** RTI2018-101256-J-I00. **Funding period:** 2019-2022. **Total amount:** 189,970€
- Title:** Cell mechanosensing through cadherin complexes (CADHFORCE). **Affiliation institution:** Fundació Privada Institut de Bioenginyeria de Catalunya (IBEC). **PI:** Xavier Trepap. **Coordinator:** Raimon Sunyer. **Funding body:** CIBER-BBN. **Reference:** CADHFORCE. **Funding period:** 2018-2020. **Total amount:** 64,000€
- Title:** Micro Gradient Polyacrylamide Gels for High Throughput Electrophoresis Analysis. **Affiliation institution:** Fundació Privada Institut de Bioenginyeria de Catalunya (IBEC). **PI:** Xavier Trepap. **Implementation:** Raimon Sunyer. **Funding body:** European Research Council, Proof of Concept. **Reference:** 632269. **Funding period:** 2014-2015. **Total amount:** 148,963€

PREVIOUS FUNDING AS A PARTICIPANT (SINCE 2010)

- Title:** Durotaxis of Cancer Associated Fibroblasts (DUROCAF). **Affiliation institution:** Fundació Privada Institut de Bioenginyeria de Catalunya (IBEC). **Coordinator:** Xavier Trepap. **Funding body:** CIBER-BBN. **Reference:** DUROCAF. **Funding period:** 2016-2018. **Total amount:** 64,000€
- Title:** Mechanobiology of collective cell migration during haptotaxis and durotaxis: application to intestinal organoids (mGRADIENT). **Affiliation institution:** Fundació Privada Institut de Bioenginyeria de Catalunya (IBEC). **PI:** Xavier Trepap. **Funding body:** Ministerio de Ciencia, Innovación y Universidades. **Reference:** PGC2018-099645-B-I00. **Funding period:** 2019-2022. **Total amount:** 375.100€
- Title:** Mechanical control of biological function (MECHANO-CONTROL). **Affiliation institution:** Fundació Privada Institut de Bioenginyeria de Catalunya (IBEC). **Head(s) researcher(s):** Pere Roca and Xavier Trepap. **Funding body:** H2020 FETPROACT. **Reference:** 731957. **Funding period:** 2017-2021. **Total amount:** 7.134.929€. IBEC budget: 1.952.420€
- Title:** Mecanobiología de la durotaxis: de las células aisladas a los tejidos. **Affiliation institution:** Fundació Privada Institut de Bioenginyeria de Catalunya (IBEC). **PI:** Xavier Trepap. **Funding body:** Ministerio de Economía y Competitividad. **Reference:** BFU2015-65074-P. **Funding period:** 2016-2018. **Total amount:** 320.166€
- Title:** Multiscale regulation of epithelial tension (TensionControl). **Affiliation institution:** Fundació Privada Institut de Bioenginyeria de Catalunya (IBEC). **PI:** Xavier Trepap. **Funding body:** European Research

Council, Consolidator grant. **Reference:** ERC-2013-CoG-616480. **Funding period:** 2015-2019. **Total amount:** 1.981.761,45€

Title: The mechanome of epithelial adhesion: unveiling the mechanisms of intercellular force detection, resistance, and transmission. **Affiliation institution:** Fundació Privada Institut de Bioenginyeria de Catalunya (IBEC). **PI:** Xavier Trepatri. **Funding body:** Ministerio de Economía y Competitividad. **Reference:** BFU2012-38146. **Funding period:** 2013-2015. **Total amount:** 210.000€

Title: Physical forces driving collective cell migration: From genes to mechanism. **Affiliation institution:** Fundació Privada Institut de Bioenginyeria de Catalunya. **PI:** Xavier Trepatri. **Funding body:** European Research Council, Starting Grants. **Reference:** 242993. **Funding period:** 2009-2014. **Total amount:** 1.749.745€

Title: Integrative Cell Biophysics. **Affiliation institution:** National Institutes of Health **PI:** Ralph Nossal. **Funding body:** NIH intramural program. **Reference:** HD008841-06. **Funding period:** 2011-2012. **Total amount:** \$414.888€

PUBLICATIONS IN INDEXED JOURNALS

First author publications: 5, including one in *Science* (2016)

Corresponding author publications: 5, including one in *Nature Physics* and another in *Nature Materials* (2017) and a review in *Current Biology* (2020)

List of Publications

* Co-first author

** Corresponding author or co-corresponding author

IF indicates the impact factor according to Thomson Reuters (Web of Science) in the year of publication

Q indicates quartile according to Thomson Reuters (Web of Science) in the year of publication

D1 indicates that the Journal is in the first Decile according to Thomson Reuters (Web of Science) in the year of publication

Publications since I joined the Serra-Hunter Program:

- Fortunato IC, Brückner D, Grosser S, ..., **Sunyer** R**, Hannezo** E, Trepatri** X: Single cell migration along and against confined haptotactic gradients. *BioRxiv* 2024.12.02.626413. *Under revision*.
- Pallarès ME, Pi-Jaumà I, Fortunato IC, Gazu V, Gómez-González M, Roca-Cusachs P, de la Fuente JM, Alert R, **Sunyer R****, Casademunt J and Trepatri X, “Stiffness-dependent active wetting enables optimal collective cell durotaxis,” *Nat. Phys.*, pp. 1–11, 2022 (D1, IF=19.5).
- Marín-Llauradó, S. Kale, A. Ouzeri, T. Golde, **R. Sunyer**, A. Torres-Sánchez, E. Latorre, M. Gómez-González, P. Roca-Cusachs, M. Arroyo, X. Trepatri, “Mapping mechanical stress in curved epithelia of designed size and shape”. *Nature Comm.* 14(1), 4014, 2023 (Q1, IF=17)
- Sposini V, Krapf D, Marinari E, **Sunyer R**, Ritort F, Taheri F, Selhuber-Unkel C, Benelli R, Weiss M, Metzler R: Towards a robust criterion of anomalous diffusion. *Communications Physics*, 5:305, 2022 (Q1, IF = 5.5)
- López-Mengual A, Segura-Feliu M, **Sunyer R**, Sanz-Fraile H, Otero J, Mesquida-Veny F, Gil V, Hervera A, Ferrer I, Soriano J, “Involvement of mechanical cues in the migration of Cajal-Retzius cells in the marginal zone during neocortical development,” *Front. Cell Dev. Biol.*, vol. 10, 2022. (Q1, IF=6.684)
- Fortunato C and **Sunyer R****, “The Forces behind Directed Cell Migration,” *Biophysica*, vol. 2, no. 4, pp. 548–563, 2022. (no impact factor, yet)

- Farré R, Rodríguez-Lázaro MA, Otero J, Gavara N, **Sunyer R**, Farré N, Gozal D, Almendros I. “Low-cost, open-source device for simultaneously subjecting rodents to different circadian cycles of light, food, and temperature”. *Frontiers in Physiology*, 15:1356787, 2024 (Q1, IF=4)
- Sanz-Fraile H, Herranz-Diez C, Ulldemolins A, Falcones B, Almendros I, Gavara N, **Sunyer R**, Farré R, Otero J, “Characterization of Bioinks Prepared via Gelifying Extracellular Matrix from Decellularized Porcine Myocardia”. *Gels*, 9:745, 2023 (Q1, IF=4.6).
- Jurado A, Ulldemolins A, Lluís H, Gasull X, Gavara N, **Sunyer R**, Otero J, Gozal D, Almendros I, Farré R: “Fast cycling of intermittent hypoxia in a physiometric 3D environment: A novel tool for the study of the parenchymal effects of sleep apnea”. *Frontiers in Pharmacology*, 13:1081345, 2023 (Q1, IF=5.6)

Publications prior to joining the Serra-Hunter program

- **Sunyer** R**, Trepas** X: Durotaxis. *Curr Biol* 2020, 30:R383–R387. (IF=9.601, for 2019 as 2020 was not available, Q1, D1)
- Escribano J, **Sunyer R**, Sánchez MT, Trepas X, Roca-Cusachs P, García-Aznar JM: A hybrid computational model for collective cell durotaxis. *Biomech Model Mechanobiol* 2018, 17:1037–1052. (IF=2.829, Q2)
- Sehgal P, Kong X, Wu J, **Sunyer R**, Trepas X, Leckband D: Epidermal growth factor receptor and integrins control force-dependent vinculin recruitment to E-Cadherin junctions. *J Cell Sci* 2018, doi:10.1242/jcs.206656. (IF=4.517, Q2)
- Rodríguez-Franco P, Brugués A, Marín-Llauradó A, Conte V, Solanas G, Batlle E, Fredberg JJ, Roca-Cusachs P, **Sunyer** R**, Trepas** X: Long-lived force patterns and deformation waves at repulsive epithelial boundaries. *Nat Mater* 2017, 16:1029–1037. (IF=39.235, Q1, D1)
- Li H, Xu B, Zhou EH, **Sunyer R**, Zhang Y: Multiscale Measurements of the Mechanical Properties of Collagen Matrix. *ACS Biomater Sci Eng* 2017, 3:2815–2824. (IF=4.511, Q2)
- **Sunyer R**, Conte V, Escribano J, Elosegui-Artola A, Labernadie A, Valon L, Navajas D, García-Aznar JM, Muñoz JJ, Roca-Cusachs P, et al.: Collective cell durotaxis emerges from long-range intercellular force transmission. *Science* 2016, 353:1157–1161. (IF=34.661, Q1, D1)
- Przybyla L, Lakins JN, **Sunyer R**, Trepas X, Weaver VM: Monitoring developmental force distributions in reconstituted embryonic epithelia. *Methods San Diego Calif* 2016, 94:101–113. (IF=3.503, Q2)
- Serra-Picamal X, Conte V, **Sunyer R**, Muñoz JJ, Trepas X: Chapter 17 - Mapping forces and kinematics during collective cell migration. In *Methods in Cell Biology*. Edited by Paluch EK. Academic Press; 2015:309–330. (IF=1.097, Q4)
- García* S, **Sunyer* R**, Olivares A, Noailly J, Atencia J, Trepas X: Generation of stable orthogonal gradients of chemical concentration and substrate stiffness in a microfluidic device. *Lab Chip* 2015, 15:2606–2614. (IF=5.586, Q1, D1)
- Elosegui-Artola A, Bazellères E, Allen MD, Andreu I, Oria R, **Sunyer R**, Gomm JJ, Marshall JF, Jones JL, Trepas X, et al.: Rigidity sensing and adaptation through regulation of integrin types. *Nat Mater* 2014, 13:631–637. (IF=36.425, Q1, D1)
- Roca-Cusachs P, **Sunyer R**, Trepas X: Mechanical guidance of cell migration: lessons from chemotaxis. *Curr Opin Cell Biol* 2013, 25:543–549. (IF=11.4, Q1, D1)
- **Sunyer** R**, Jin AJ, Nossal R, Sackett DL: Fabrication of Hydrogels with Steep Stiffness Gradients for Studying Cell Mechanical Response. *PLoS ONE* 2012, 7:e46107. (IF=3.73, Q1)

- **Sunyer R**, Trepas X, Fredberg JJ, Farré R, Navajas D: The temperature dependence of cell mechanics measured by atomic force microscopy. *Phys Biol* 2009, 6:025009. (IF=3.086, Q2)
- **Sunyer R**, Ritort F, Farré R, Navajas D: Thermal activation and ATP dependence of the cytoskeleton remodeling dynamics. *Phys Rev E* 2009, 79:051920. (IF=2.4, Q1)
- Puig F, Gavara N, **Sunyer R**, Carreras A, Farré R, Navajas D: Stiffening and Contraction Induced by Dexamethasone in Alveolar Epithelial Cells. *Exp Mech* 2009, 49:47–55. (IF=1.542, Q1)
- Roca-Cusachs P, Alcaraz J, **Sunyer R**, Samitier J, Farré R, Navajas D: Micropatterning of Single Endothelial Cell Shape Reveals a Tight Coupling between Nuclear Volume in G1 and Proliferation. *Biophys J* 2008, 94:4984–4995. (IF=4.683, Q1)
- Gavara N, Roca-Cusachs P, **Sunyer R**, Farré R, Navajas D: Mapping Cell-Matrix Stresses during Stretch Reveals Inelastic Reorganization of the Cytoskeleton. *Biophys J* 2008, 95:464–471. (IF=4.683, Q1)
- Rico F, Roca-Cusachs P, **Sunyer R**, Farré R, Navajas D: Cell dynamic adhesion and elastic properties probed with cylindrical atomic force microscopy cantilever tips. *J Mol Recognit* 2007, 20:459–466. (IF=3.767, Q2)
- Roca-Cusachs P, Almendros I, **Sunyer R**, Gavara N, Farré R, Navajas D: Rheology of Passive and Adhesion-Activated Neutrophils Probed by Atomic Force Microscopy. *Biophys J* 2006, 91:3508–3518. (IF=4.683, Q1)
- Gavara N, **Sunyer R**, Roca-Cusachs P, Farré R, Rotger M, and Navajas D: Thrombin-induced contraction in alveolar epithelial cells probed by traction microscopy. *J Appl Physiol* 2006, 101:512–520. (IF=3.178, Q1)
- Elhajal M, Canals B, **Sunyer R**, Lacroix C: Ordering in the pyrochlore antiferromagnet due to Dzyaloshinsky-Moriya interactions. *Phys Rev B* 2005, 71:094420. (IF=3.475, Q1)

SERVICE TO THE PROFESSION AND TO INSTITUTIONS

Reviewer for the journals: **Nature Communications**, **EMBO Journal**, **Langmuir**, **Review of Scientific Instruments**, **Cell Biochemistry and Biophysics (CBB)**, **Biomechanics and Modeling in Mechanobiology (BMM)** and **Nature Physics**.

Panel member of the **Juan de la Cierva** for the **Spanish Agency of Investigation (AEI)**

Grant reviewer for the **Spanish Agency of Investigation (AEI)** and the **Polish National Science Centre (NCN)**, and **Cancer Inserm (France)**

TEACHING AND MENTORING

Teaching positions

2021-present	Assistant Professor, Department of Biomedicine, School of Medicine, University of Barcelona. 210-250h/year of teaching duties. Coordinator of the 1 st year of Biomedical Engineering (2022-present) Coordinator of the courses: Biophysics (2022-present) and Techniques and Analysis in Medical Imaging (2023-present) Erasmus Coordinator for Biomedical Engineering students (2024)
2018-2021	Part-time Lecturer, Department of Biomedicine, School of Medicine, University of Barcelona
2003-2006	Teaching duties during my Ph.D.

Summary of my main teaching experience

Underscored text highlights the courses I coordinate.

Degree	Course	Language	Position	Materials taught	Course Credits	Hours Taught/year	Years Taught
Medicine	General Biophysics	Catalan/Spanish	Teacher	Theory, problems & lab sessions	6	107	2019-present
<u>Biomedical Engineering</u>	<u>Biophysics</u>	<u>English</u>	<u>Teacher/Coordinator</u>	<u>Theory, problems & lab sessions</u>	<u>6</u>	<u>30</u>	<u>2018-present</u>
Biomedical Engineering	Cellular and molecular biophysics	English	Teacher	lab sessions	6	12	2021-present
Biomedical Engineering	Artificial Intelligence	English	Teacher	Theory & lab sessions	6	59	2021-present
<u>Biomedical Engineering Master</u>	<u>Techniques Medical Imaging</u>	<u>English</u>	<u>Teacher/Coordinator</u>	<u>Theory & lab sessions</u>	<u>5</u>	<u>10</u>	<u>2021-present</u>
Physics	Medical Physics	Catalan/Spanish	Teacher	Theory & Lab sessions	6	15	2021-present
Medicine	General Biophysics	Catalan/Spanish	Teacher	Lab sessions	6	34-68h	2003-2006
Biology	Physics for Biologists	Catalan/Spanish	Teacher	Problems	6	20h	2003-2005

Teaching responsibilities

2021-present	Assistant professor, Medical School, University of Barcelona. 210-250h/year
2020-2021	Biomedical Engineering, Medical School, University of Barcelona. Course: Biophysics. Theory, Problems and Laboratory sessions. 30h of classes and 20h tutorships
2020-2021	Medicine, Medical School, University of Barcelona. Course: Medical Biophysics. Theory, Problems and Laboratory sessions. 30h of classes and 20h tutorships
2019-2020	Biomedical Engineering, Medical School, University of Barcelona. Course: Biophysics. Theory, Problems and Laboratory sessions. 30h of classes and 20h tutorships
2005-2006	Medicine, Medical School, University of Barcelona. Course: Biophysics. Laboratory sessions. 68h of classes
2005-2005	Medicine, Medical School, University of Barcelona. Course: Biophysics. Laboratory sessions. 34h of classes
2003-2004	Medicine, Medical School, University of Barcelona. Course: Biophysics. Laboratory sessions. 34h of classes
2004-2005	Biology, Faculty of Biology, University of Barcelona. Course: Physics for Biologists. Problems 20h
2003-2004	Biology, Faculty of Biology, University of Barcelona. Course: Physics for Biologists. Problems 20h

UNIVERSITY ACCREDITATIONS

Accreditation as Lecturer (“Acreditació professor Lector”) AQU (Agència per la Qualitat Universitària a Catalunya), 2016

Accreditation as Associate professor (“Acreditació Recerca”) AQU (Agència per la Qualitat Universitària a Catalunya), 2016

ADDITIONAL TEACHING ACTIVITIES

Jury member in the evaluation of:

- Ongoing Ph.D. theses, Doctoral Program in Biomedicine
- Ph.D. defense (University of Barcelona)

SUPERVISION OF MASTER AND PH.D. THESIS

- Co-direction of Doctoral thesis: “Mechanobiology of single cell migration on patterned fibronectin gradients”. Student: Isabela Fortunato. Defended on 18-11-2024
- Co-direction of Doctoral thesis: “Cell mechanosensing through cadherin complexes”. Student: Macià Pallarès. Defended on 08-03-2022
- Master thesis: Micropatterning of stiffness gradient polyacrylamide gels. Student: Carlos Ureña, Excellent qualification obtained
- Master thesis: Micropatterning of stiffness gradient polyacrylamide gels. Student: Nathalia Gómez Jiménez, Excellent qualification obtained
- Ongoing co-supervision of a Ph.D. thesis under the project “Mechanotransduction of Collective Haptotaxis”. Student: Isabela Fortunato
- Ongoing co-supervision of a Ph.D. thesis under the project “Physiotaxis”. Student: Marina Moro
- Ongoing co-supervision of a Ph.D. thesis under the project “Physiotaxis”. Student: Sergi Olivé
- Ongoing co-supervision of a Ph.D. thesis under the project “MEchSensesence”. Student: Martina Serrat

AWARDS AND FELLOWSHIPS

Spanish Government Ramon y Cajal Tenure Track Fellowship (September 2020)

Government of Catalonia postdoctoral fellowship (Beatriz de Pinós modalitat A) (July 2010-July 2012)

NIH Postdoctoral Fellowship (January 2010-June 2010)

Government of Catalonia Ph.D. fellowship (Beca FI) (2004-2008)

Government of Catalonia Travel Award (Beca BE) for the candidate’s work at Fredberg Lab, Harvard University

Fellowship to collaborate with university departments. Ministerio de Ciencia y tecnología (2004)

First Class Honors Fellowship (Spanish University Access Test)

LANGUAGES

Catalan and Spanish (native languages)

English. TOFL. Negotiation level. TOEFL iBT, 2009). More than 3 years of experience working in US institutions

INVITED TALKS AND SEMINARS

Sunyer, R. “*Moving Together towards the stiff*”. Molecular Biology Institute of Barcelona. Barcelona, Spain. 10/6/2023

- Sunyer, R. “*Collective Durotaxis Emerges from Long-Range Force Transmission*”. 6th International Symposium Interface Biology of Implants (IBI). Rostock (Germany). 8/5/2019
- Sunyer, R. “*Durotaxis of Cancer Associated Fibroblasts*”. CIBER-BBN 2018 Annual Conference. Valladolid (Spain). 12/11/2018
- Sunyer, R. “*Collective Durotaxis Emerges from Long-Range Force Transmission*”. 9th International Conference of Engineering Chemical Complexity. Vilanova i la Geltrú (Spain). 19/05/2017
- Sunyer, R; Conte V; Escribano J; García-Aznar J.M.; Muñoz J.J.; Roca-Cusachs P.; X Trepas. “*Collective Durotaxis Emerges from Long-Range Force Transmission*”. American Association of Cell Biology (ASCB) meeting. San Diego (USA). 12/12/2015
- R. Sunyer. “*Contribution of active processes to cytoskeleton dynamics*”. Institute Curie. Invited by Cécile Sykes. 25/6/2009
- R. Sunyer. “*Cell Mechanics: Experimental results and theoretical models*”. Faculty of Physics, University of Barcelona, Barcelona. Invited by Felix Ritort. 21/03/2006

CONGRESSES

Participation in congresses after joining the Serra-Hunter program

1. Macià-Esteve Pallarés, Irina Pi-Jaumà, Isabela Corina Fortunato, Valeria Grazu, Manuel Gómez-González, Pere Roca-Cusachs, Jesus de la Fuente, et al. *Optimal collective durotaxis through active wetting*, **DPG Spring Meeting of the Condensed Matter Section (SKM)**, Dresden, Germany, International, Oral (2023)
2. Carolina Herranz-Diez, Anna Ulldemolins, Ramon Farré, Núria Gavara, Isaac Almendros, Raimon Sunyer, Jorge Otero. *Extracellular matrix hydrogels for the study of lung inflammatory processes*, **Advanced Functional Polymers for Medicine 2023**, Barcelona, Spain, International, Poster (2023)
3. Fortunato I.C., Sunyer R., Trepas X. *Cell migration up and down fibronectin gradients*, **16th IBEC Symposium: Bioengineering for future and precision medicine**, Barcelona, Spain, International, Poster (2023)
4. Isabela Corina-Fortunato, Raimon Sunyer, Xavier Trepas. *Cell Guidance in Non-Monotonic Patterns of Fibronectin Density*, **Directed Cell Migration (Gordon Research Seminar)**, Galveston, USA, International, Oral (2023)
5. Macià-Esteve Pallarés, Irina Pi-Jaumà, Isabela Corina Fortunato, Valeria Grazu, Manuel Gómez-González, Pere Roca-Cusachs, Jesus de la Fuente, et al., *Durotaxis and frictiotaxis*, **APS March Meeting**, Minneapolis, USA, International, Oral (2023)
6. Isabela Corina-Fortunato, Raimon Sunyer, Xavier Trepas. *Cell Guidance in Non-Monotonic Patterns of Fibronectin Density*, **Directed Cell Migration - Gordon Research Conference**, Galveston, USA, International, Oral (2023)
7. Leda Lacaria, Raimon Sunyer, Xavier Trepas, Loic Le Goff, Felix Rico, *Oncogenic Ras induces differences in cell mechanics and cytoskeleton organization in HMLE cells*, **9th Biennial European Cell Mechanics Meeting**, Marsella, France, International, Oral (2023)
8. Esteve Pallarés, Macià, Pi-Jaumà, Irina, Corina Fortunato, Isabela, Grazú, Valeria, Gómez-González, Manuel, Roca-Cusachs, Pere, Fuente, Jesús M, et al., *Stiffness-dependent active wetting enables optimal collective cell durotaxis*, **9th Biennial European Cell Mechanics Meeting**, Marsella, France, International, Oral (2023)
9. Macià-Esteve Pallarés, Irina Pi-Jaumà, Isabela Corina Fortunato, Valeria Grazu, Manuel Gómez-González, Pere Roca-Cusachs, Jesus de la Fuente, et al., *Following the stiff path. Stiffness-dependent active wetting enables optimal collective durotaxis*, **Physics of Living Matter**, Marseille, France, International, Oral (2023)
10. Macià-Esteve Pallarés, Irina Pi-Jaumà, Isabela Corina Fortunato, Valeria Grazu, Manuel Gómez-González, Pere Roca-Cusachs, Jesus de la Fuente, et al., *Durotaxis and frictiotaxis*, **9th International Discussion Meeting on Relaxations in Complex Systems**, Chiba, Japan, International, Oral, (2023)
11. Macià-Esteve Pallarés, Irina Pi-Jaumà, Isabela Corina Fortunato, Valeria Grazu, Manuel Gómez-González, Pere Roca-Cusachs, Jesus de la Fuente, et al., *Durotaxis and frictiotaxis*, **New statistical physics in living matter: non-equilibrium states under adaptive control**, Cambridge, UK, International, Oral (2023)
12. Macià-Esteve Pallarés, Irina Pi-Jaumà, Isabela Corina Fortunato, Valeria Grazu, Manuel Gómez-González, Pere Roca-Cusachs, Jesus de la Fuente, et al., *Durotaxis and frictiotaxis*, **International Conference on Biological Physics**, Seoul, Korea, International, Oral (2023)

13. Macià-Esteve Pallarés, Irina Pi-Jaumà, Isabela Corina Fortunato, Valeria Grazú, Manuel Gómez-González, Pere Roca-Cusachs, Jesús M de la Fuente, et al., *Stiffness-dependent wetting enables optimal collective durotaxis*, **Mechanobiology of cancer summer school 2022**, Prullans, La Cerdanya, Spain, International, Oral (2022)
14. López-Mengual A, Segura-Feliu M, Sunyer R, Sanz-Fraile H, Otero J, Mesquida-Veny F, Gil V, Hervera A, Ferrer I, Soriano J, Trepas X, Farr, R, Navajas, et al., *Involvement of mechanical cues in the migration of Cajal-Retzius cells in the marginal zone during neocortical development*, **15th IBEC international symposium: Bioengineering for active ageing**, Barcelona, Spain, International, Poster (2022)
15. Macià-Esteve Pallarés, Irina Pi-Jaumà, Isabela Corina Fortunato, Valeria Grazú, Manuel Gómez-González, Pere Roca-Cusachs, Jesús M de la Fuente, et al. *Stiffness-dependent wetting enables optimal collective durotaxis*, **Biology for Physics: is there any new Physics for Living Matter?**, Barcelona, Spain, International, Poster (2022)
16. Fortunato IC, Sunyer R, Trepas X. *Mechanobiology of cell migration during haptotaxis*, **15th IBEC Symposium - Bioengineering for active ageing**, Barcelona, Spain, International, Poster, 2022
17. Fortunato IC, Sunyer R, Trepas X. *Mechanobiology of cell migration during haptotaxis*. **Mechanobiology of Cancer Summer School 2022**, Prullans, Spain, International, Poster (2022)
18. Fortunato I.C., Sunyer R., Trepas X. *Mechanobiology of cell migration during haptotaxis*, **5th Biomed PhD day**, Barcelona, Spain, International, Poster (2022)
19. Fortunato I.C., Sunyer R., Trepas X. *Mechanobiology of cell migration during haptotaxis*, **Mechanobiology of Cancer Summer School 2022**, Prullans, Spain, International, Oral (2022)
20. Macià-Esteve Pallarés, Irina Pi-Jaumà, Isabela Corina Fortunato, Valeria Grazú, Manuel Gómez-González, Pere Roca-Cusachs, Jesús M de la Fuente, et al. *Stiffness-dependent wetting enables optimal collective durotaxis*, **XI Reunión del Capítulo Español de La Sociedad Europea de Biomecánica - ESB 2022**, Zaragoza, Spain, National, Oral (2022)
21. Macià-Esteve Pallarés, Irina Pi-Jaumà, Isabela Corina Fortunato, Valeria Grazú, Manuel Gómez-González, Pere Roca-Cusachs, Jesús M de la Fuente, et al. *Stiffness-dependent wetting enables optimal collective durotaxis*, **ASCB/EMBO meeting CellBio 2022**, Washington, USA, International, Poster (2022)
22. López-Mengual A, Segura-Feliu M, Sunyer R, Sanz-Fraile H, Otero J, Mesquida-Veny F, Gil V, Hervera A, Ferrer I, Soriano J, Trepas X, Farr, R, Navaja, et al. *Molecular and physical factors coordinate Cajal-Retzius cell migration in the marginal zone during neocortical development*, **FENS forum 2022**, Paris, France, International, Poster (2022)
23. Leda Lacaria, Raimon Sunyer, Xavier Trepas, Loic Le Goff, Felix Rico. *Oncogenic Ras induces differences in cell mechanics and cytoskeleton organization in HMLE cells*, **AQV DAYS 2022: QUANTITATIVE APPROACHES TO LIVING SYSTEMS**, Paris, France, International, Oral (2022)
24. Macià-Esteve Pallarés, Irina Pi-Jaumà, Isabela Corina Fortunato, Valeria Grazú, Manuel Gómez-González, Pere Roca-Cusachs, Jesús M de la Fuente, et al. *Stiffness-dependent wetting enables optimal collective durotaxis*, **Physics of Life Summer School 2022 - Interdisciplinary Challenges: from Non-equilibrium Physics to Life Sciences**, Edinburgh, UK, International, Poster (2022)
25. Macià-Esteve Pallarés, Irina Pi-Jaumà, Isabela Corina Fortunato, Valeria Grazu, Manuel Gómez-González, Pere Roca-Cusachs, Jesus de la Fuente, et al. *Optimal collective durotaxis through active wetting*, **From Physics to Function**, Buxted Park, UK, International, Oral (2022)

Participation in congresses before joining the Serra-Hunter program

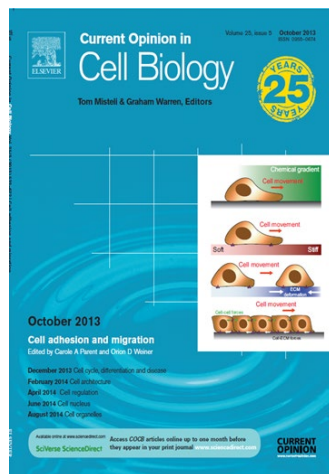
26. Marín-Llauradó A., Kale, S., Ouzeri, A., Sunyer, R., Torres-Sánchez, A., Latorre, E., Gómez-González, M., Roca-Cusachs, P., Arroyo, M. and Trepas. *Engineering epithelial shape and mechanics from the bottom up*, **EMBO | EMBL Symposium: Synthetic Morphogenesis: From Gene Circuits to Tissue Architecture**, On line, Germany, International, Oral (2021)
27. Marín-Llauradó A, Kale S, Torres-Sánchez A, Latorre E, Sunyer R, Gómez-González M, Arroyo M, Trepas X. *Linking epithelial geometry to tension and pressure in curved epithelial monolayers*, **Synthetic Morphogenesis: From Gene Circuits to Tissue Architecture (EMBL Symposia)**, On line, Spain, International, Oral (2021)
28. Pallarés, M-E., Pi-Jaumà, I., Fortunato, IC, Grazú, V., de la Fuente, J.M, Gómez González, M., Roca-Cusachs, P., Alert, R., Sunyer, R., Casdemunt, X. Trepas. *A novel durotactic migration emerges from the proximity to a wetting transition*, **14th IBEC Symposium - Bioengineering for Regenerative Therapies**, Barcelona, Spain, National, Poster (2021)
29. Macià Pallarés, Raimon Sunyer, Xavier Trepas. *Active wetting drives migration, rolling and durotaxis on cadherin coated substrates*, **IN2UB Meeting 2021**, Barcelona, Spain, National, Poster (2021)

30. R. Sunyer, **Lorentz Center Workshop: Cancer in a Physical Context: From Understanding to Therapeutics**, Leiden, Netherlands, International, Round table (2021)
31. Ana López-Mengual, Miriam Segura-Feliu, Raimon Sunyer, Hector Sanz-Fraile, Jorge Otero Francina Mesquida-Veny, Vanessa Gil-Fernandez, Jordi Ortín R., et al. *Molecular and physical factors modulating Cajal-Retzius cells migration and distribution in cortical development*, **13th IBEC Symposium: Bioengineering for future and precision Medicine**, Barcelona, Spain, International, Poster (2020)
32. Macià Esteve Pallarés, Beatriz Martín, Valeria Grazú, Jesús M. de la Fuente, Raimon Sunyer, Xavier Trepát, *Ultrafast E-cadherin durotaxis through a wetting transition*, **EMBL & IBEC Winter Conference on ENGINEERING MULTICELLULAR SYSTEMS**, Barcelona, Spain, International, Poster (2020)
33. M. Pallarés, R. Sunyer, X. Trepát, *Ultrafast cadherin durotaxis through a wetting transition*, **13th IBEC Symposium**, Barcelona, Spain, National, Oral (2020)
34. Ana López-Mengual, Raimon Sunyer, Miriam Segura-Feliu, Héctor Sanz-Fraile, Jordi Otero, Francina Mesquida-Veny, Vanessa Gil Fernandez, Jordi Soriano, et al., *Molecular and physical factors controlling Cajal-Retzius migration in brain development*, **FENS MEETING 2020**, On line, UK, International, Poster (2020)
35. Sunyer R, Conte V, Escribano J, Elosegui-Artola A, Labernadie A, Valon L, Navajas D, García-Aznar JM, Muñoz J, Roca-Cusachs P, Trepát X. *Collective cell durotaxis emerges from long-range intercellular force transmission*, **6th International Symposium Interface Biology of Implants (IBI)**, Rostock, Germany, International, Oral (2019)
36. Sunyer, R & X. Trepát. *Durotaxis of Cancer Associated Fibroblasts*. **CIBER-BBN 2018 Annual Conference**. Valladolid, Spain, Oral (2018)
37. Raimon Sunyer, Vito Conte, Jorge Escribano, Alberto Elosegui-Artola, Anna Labernadie, Leo Valon, Daniel Navajas, Jose Manuel García-Aznar, et al. *Collective durotaxis emerges from long range intercellular force transmission*, **9th International Conference 'ENGINEERING OF CHEMICAL COMPLEXITY' (ECC9)**, Barcelona, Spain, International, Invited (2019)
38. Muncie, JM; Przybyla, L; Lakins, J; Sunyer, R; Trepát, X; Weaver, VM. *Tissue-level forces regulate Wnt/ beta-catenin-dependent mesoderm differentiation within self-organized regions of human embryonic stem cell colonies*. **Meeting of the American Society for Cell Biology**, San Diego, USA, International, Oral (2015)
39. Sunyer, R; Conte V; Escribano J; García-Aznar J.M.; Muñoz J.J.; Roca-Cusachs P.; X Trepát. *Collective Durotaxis emerges from long range force transmission*. **9th International Conference of Engineering Chemical Complexity**. Vilanova i la Geltrú, Spain, Oral (2017)
40. Sunyer, R; Roca-Cusachs P.; X Trepát. *Emergence of supracellular boundaries on stiffness gradients*. **American Association of Cell Biology (ASCB) meeting**. San Francisco, USA, Poster (2017)
41. Sunyer, R; Conte, V; Escribano, J; Elosegui-Artola, A; Labernadie, A; Valon, L; Navajas, D; JM; Muñoz, JJ; Roca-Cusachs, P; Trepát, X. *Collective durotaxis emerges from long range force transmission*. **9th Symposium on Bioengineering for Active Ageing**. Barcelona, Spain, National, Oral (2016)
42. Sunyer, R., Conte, V., Escribano, J., Garcia-Aznar, J.M., Muñoz, J., Roca-Cusachs, P., Trepát, X., *Emergent mechanisms of collective cell durotaxis*. **Meeting of the American Society for Cell Biology**, San Diego, USA, International, Oral (2015)
43. Rodríguez-Franco,P; Brugués, A; Conte, V; Sunyer, R; Trepát, X. *Long-lived force patterns and deformation waves at repulsive epithelial boundaries*. **8th IBEC Symposium (Bioengineering for Regenerative Therapies)**. Barcelona, Spain, International, Poster (2015)
44. Rodríguez-Franco P; Brugués, A; Güell, G; Sunyer, R; Conte, V.; X Trepát. *Forces driving epithelial boundary formation by Eph/Ephrin interactions*. **American Association of Cell Biology (ASCB) meeting**, San Diego USA, International, Poster (2015)
45. S Garcia; R Sunyer; J Atencia; X Trepát. *An assay to study cellular responses to simultaneous mechanical and chemical gradients*. **American Association of Cell Biology (ASCB) meeting**. Philadelphia, USA, International, Poster (2014)
46. Sunyer R, Jin, A, Sackett, DL and Nossal R. *Fabrication of Hydrogels with Gradient of Compliance: Application to Cell Mechanotaxis and Durotaxis*. **Biophysical Society Meeting**, San Diego, USA, International, Poster (2012)
47. Sunyer R, Ritort F, Farré F and Navajas D. *The temperature dependence of cell mechanics measured by atomic force microscopy*. **XXIV Trobades Científiques de la Mediterrània**. Maó, Spain, National, Oral (2008)
48. Sunyer R, Ritort F, Navajas D., *Effect of temperature on cell rheology probed by Atomic Force Microscopy*, **International Meeting on AFM in Life Sciences and Medicine**, Barcelona, Spain, International, Poster (2007)
49. Roca-Cusachs, P., Alcaraz, J., Sunyer, R., Samitier, J., Farré, R., Navajas, D. *Role of Nuclear Swelling and Cytoskeletal Stiffness in Cell Shape Control of Proliferation*, **2nd European Meeting on Cell Mechanics**, Barcelona, Spain, International, Oral (2007)

50. Sunyer R, Ritort F, Navajas D. *Thermally Activated Model of Cytoskeleton Superdiffusive*, **2nd European Meeting on Cell Mechanics**, Barcelona, Spain, International, Oral (2007)
51. Roca-Cusachs, P., Alcaraz, J., Sunyer, R., Samitier, J., Farre, R., Navajas, D., *Cell shape control of proliferation is coupled to nuclear volume but not to cytoskeletal stiffness in single endothelial cells*, **XXXIV Congress of the Sociedad Española de Ciencias Fisiológicas**, Valladolid, Spain, National, Oral (2007)
52. Sunyer, R., Ritort, R., Farré, R., Navajas, D. *No equilibrio y activación térmica de la dinámica de la remodelación del citoesqueleto*, **II Jornades de Biofísica - Societat Catalana de Biologia**, Barcelona, Spain, National, Oral (2007)
53. Gavara N, Puig F, Sunyer R, Farré, R, Navajas D. *Effects of dexamethasone in contraction of alveolar epithelial cells*, **5th World Congress of Biomechanics**, Munich, Germany, International, Poster (2006)
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55. Farre R, Puig, Gavara N, Sunyer R, Navajas D. *Cell stiffening and contraction induced by thrombin in alveolar epithelial cells treated with dexamethasone*, **European Respiratory Society**, Munich, Germany, International, Oral (2006)
56. N. Gavara, D. Biedma, R. Sunyer, R. Farré, D. Navajas. *Actin cytoskeleton and myosin light chain (MLC) phosphorylation modulate thrombin-induced contraction of alveolar epithelial cells*. **Annual Congress European Respiratory Society**, Copenhagen, Denmark, International, Oral (2005)
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58. Sunyer R, Ritort F and Navajas D. *A two-state model to describe the mechanical properties of the cell*. **1st European Meeting on Cell Mechanics**, Paris, France, International, Oral (2005)
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60. Rico F, Gavara N, Sunyer R, Rotger M, Navajas D. *3-D nanoprobe for measuring mechanical properties of living cells*. **IV Jornades de Recerca en Enginyeria Biomèdica**, Barcelona, Spain, National, Oral (2004)
61. Sunyer R, Ritort F and Navajas D. *A two-state model to describe the mechanical properties of the cell*. **2nd Workshop of the European Network PHYNECS**, Cargèse, France, International, Poster (2004)

MASS MEDIA COVERAGE (SELECTION)

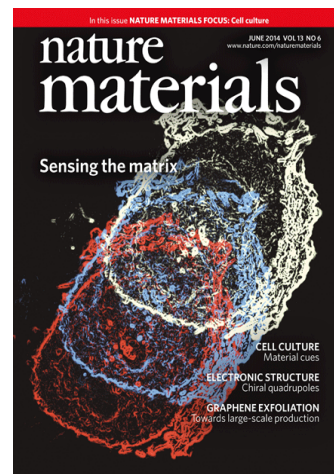
- *Cells Follow Stiffness Gradients by Playing Tug of War*. [The Scientist](#) (1/1/2016)
- *Surprising force patterns and deformation waves discovered at tissue boundaries*. [Materials Research Society Magazine](#) from Cambridge University (3/11/2017)
- *Descubren que las células cooperan para ir hacia a los tejidos más rígidos*. [La Vanguardia](#) (8/9/2016)
- *Descubren una vía para frenar la metástasis controlando el movimiento celular*. [ABC](#) (9/9/2016)
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