

**Curriculum vitae: Davide Bigoni**  
**Professor of Solid and Structural Mechanics at the University of Trento**  
**June 2026**

**Personal details**

Born in Bologna (Italy), 04/05/1959

Married, two children

Languages: Italian (mother tongue), English (fluent) and German (basic)

website: <https://bigoni.dicam.unitn.it/>

**Areas of scientific experience**

Solid Mechanics, Mechanics of Materials and Structures, Biomechanics, Metamaterials

Research Areas:

**Material Modeling and Constitutive Theory:** Nonlinear elasticity, damage, elastoplasticity, viscoplasticity, thermoplasticity; applications to ceramics, granular media, soils, rocks, and biomaterials.

**Wave Propagation and Metamaterials:** Elastic wave propagation in solids and architected materials.

**Fracture and Failure Mechanics:** Fracture, damage, and localization in porous and rock-like materials.

**Nonlinear Structural Mechanics:** Bifurcation, instability, and post-critical behavior of structures.

**Mathematical and Multiscale Modeling:** Homogenization, complex potentials, boundary integral equations, asymptotic methods.

**Numerical Methods:** Finite element and boundary element techniques.

**Experimental Mechanics:** Design, fabrication, and testing of novel mechanical devices; material characterization.

Major Scientific Achievements:

**Perturbative approach to material instabilities**

(D. Bigoni and D. Capuani 2005 Time-harmonic Green's function and boundary integral formulation for incremental nonlinear elasticity: dynamics of wave patterns and shear bands J. Mech. Phys. Solids 53, 1163)

**Experimental evidence supporting consolidation theory in human brain tissue**

(G. Franceschini, D. Bigoni, P. Regitnig and G.A. Holzapfel 2006 Brain tissue deforms similarly to filled elastomers and follows consolidation theory. J. Mech. Phys. Solids 54, 2592)

**Tensile bifurcation in slender elastic structures**

(D. Zaccaria, D. Bigoni, G. Noselli and D. Misseroni 2011 Structures buckling under tensile dead load Proc. Royal Soc. A 467, 1686)

**Experimental evidence of friction-induced flutter instability**

(D. Bigoni and G. Noselli 2011 Experimental evidence of flutter and divergence instabilities induced by dry friction J. Mech. Phys. Solids 59, 2208)

**Eshelby-like forces in elastic structures**

(D. Bigoni, F. Bosi, F. Dal Corso and D. Misseroni 2014 Instability of a penetrating blade. J. Mech. Phys. Solids 64, 411)

**Folding of solids**

(D. Bigoni, P.A. Gourgiotis 2016 Folding and faulting of an elastic continuum. Proceedings of the Royal Society A 472: 20160018)

**Flutter instability for conservative loads**

(A. Cazzolli, F. Dal Corso, D. Bigoni 2020 Non-holonomic constraints inducing flutter instability in structures under conservative loadings. J. Mech. Phys. Solids, 138, 103919)

**Elastic materials without a strain potential**

(G. Bordiga, A. Piccolroaz, D. Bigoni 2022 A way to hypo-elastic artificial materials without a strain potential and displaying flutter instability. J. Mech. Phys. Solids, 158, 104665)

**Fusion of structures**

(M. Rossi, A. Piccolroaz, D. Bigoni 2023 Fusion of two stable elastic structures resulting in an unstable system. J. Mech. Phys. Solids 173, 105201)

**Material instability and subsequent restabilization**

(D. Bigoni, A. Piccolroaz 2025 Material instability and subsequent restabilization from homogenization of periodic elastic lattices. J. Mech. Phys. Solids 200, 106129)

## University Education

- 1985 Laurea in Civil Engineering (First Class Honors), University of Bologna
- 1991 Ph.D. in Solid Mechanics. Dissertation: Localization of deformation and bifurcation in incremental non-associative elastoplasticity: applications to brittle-cohesive materials. Supervisor: T. Hueckel, Duke University
- 1992 Postdoctoral Research Fellow, University of Bath. Supervisor: J.R. Willis, FRS
- 1993 Postdoctoral Research Fellow, Brown University. Supervisors: A. Needleman and M. Ortiz

## Appointments

- 2001-*Present* Professor of Solid and Structural Mechanics, University of Trento
- 2006-2012 Coordinator, PhD program in Solid and Structural Mechanics, University of Trento
- 2001-2004 Head, Department of Mechanical and Structural Engineering, University of Trento
- 1998-2001 Associate Professor of Solid and Structural Mechanics, University of Trento
- 1990-1998 Assistant Professor of Solid and Structural Mechanics, University of Bologna
- 1986-1988 Consulting Engineer, ISMES, Bergamo, Italy

## Honors, Awards, and Distinctions

- 2026 Mid/Late Career Prize, University of Trento
- 2025 J.N. Reddy Medal for Mechanics of Advanced Materials and Structures, awarded for outstanding original contributions to flutter instabilities in solids and structures, metamaterials, plasticity, mechanics of porous media and soil mechanics, and fracture mechanics
- 2025 Eugenio Beltrami Senior Scientist Prize, International Research Center for the Mathematics and Mechanics of Complex Systems
- 2024 Fellow of the Italian Academy of Engineering (ITATEC) 'ITATEC'.
- 2022 ERC Advanced Grant 'Beyond' (2.47 M€)
- 2019 Honoree of the 60th Anniversary Issue of the Journal of the Mechanics and Physics of Solids
- 2019 Fellow of the Istituto Lombardo (Milan), Accademia di Scienze e Lettere
- 2018 Invited Guest Lecturer, Midwest Mechanics Seminars
- 2017-*Present* Featured on 9 cover pages of international journals
- 2016 Panetti and Ferrari Award for Applied Mechanics, Accademia delle Scienze di Torino
- 2014 Doctor Honoris Causa, Ovidius University of Constanța
- 2013 ERC Advanced Grant 'Instabilities' (2.38 M€)
- 2012 Ceramic Technology Transfer Day Award (of the ACIMAC and ISTEC-CNR)
- 2009 EUROMECH Fellow, European Mechanics Society, for outstanding contributions to solid mechanics, with particular emphasis on the stability of deformation of engineering and geological materials.

## Journal Covers



2014 'An elastica arm scale' *Proceedings of the Royal Society A*; 2015 'The torsional gun' *Proceedings of the Royal Society A*; 2016 'Folding and faulting of an elastic continuum' *Proceedings of the Royal Society A*; 2017 'From the elastica compass to the elastica catapult: an essay on the mechanics of soft robot arm' *Proceedings of the Royal Society A*; 2019 'Omnidirectional flexural invisibility of multiple interacting voids in vibrating elastic plates' *Proceedings of the Royal Society A*; 2021 'Dispersion of rigid line inclusions as stiffeners and shear band instability triggers' *International Journal of Solids and Structures*; 2022 'Tensile material instabilities in elastic beam lattices lead to a closed stability domain' *Philosophical Transactions of the Royal Society A*; 2023 'Flutter instability in solids and structures, with a view on biomechanics and metamaterials' *Proceedings of the Royal Society A*; 2024 'Necking of thin-walled cylinders via bifurcation of incompressible nonlinear elastic solids' *Soft Matter*

## Visiting Professorships

- 1995 Faculty of Civil Engineering, Delft University of Technology, The Netherlands
- 1997 Laboratoire Sols, Solides, Structures, Grenoble, France
- 2000 Laboratoire de Mécanique et Technologie, Ecole Normale Supérieure de Cachan, France
- 2001 Institute of Fundamental Technological Research, Polish Academy of Science, Warsaw, Poland
- 2002 Laboratoire de Mécanique et Technologie, Ecole Normale Supérieure de Cachan, France
- 2004 Graz University of Technology, Graz, Austria
- 2004 Institute of Fundamental Technological Research, Polish Academy of Science, Warsaw, Poland
- 2005 Department of Engineering Physics, University of Wisconsin-Madison, Madison WI, USA
- 2006 Department of Mathematical Sciences, University of Liverpool, UK
- 2007 Department of Mathematical Sciences, University of Liverpool, UK
- 2008 Aberystwyth University, Aberystwyth, UK
- 2010 International Centre for Mathematical Sciences, Edinburgh, UK
- 2018 CEGE, University of Minnesota, Minneapolis, USA

## Editorial Responsibilities

### Editor and Associate Editor

- 2009 – Present Co-Editor of *Journal of Mechanics of Materials and Structures*
- 2009 – Present Associate Editor of *Mechanics Research Communications*
- 2014 – Present Associate Editor of *Frontiers in Mechanics of Materials*

### Member of Editorial Board of:

- 1996 – Present Editorial Board Member, *International Journal of Solids and Structures*
- 2004 – Present Editorial Board Member, *Archives of Mechanics*, Polish Academy of Sciences
- 2011 – Present Editorial Board Member, *International Journal for Computational Methods in Engineering Science and Mechanics*
- 2012 – Present Editorial Board Member, *Journal of Elasticity*
- 2013 – Present Editorial Board Member, *Acta Mechanica Sinica*

2013 – 2026 Editorial Board Member, *Journal of the Mechanical Behavior of Materials*  
 2017 – Present Editorial Board Member, *Mechanics of Advanced Materials and Structures*  
 2018 – Present Editorial Board Member, *International Journal of Applied Mechanics*

Special issues (co-editor)

2023 *European Journal of Mechanics A/Solids* Vol. 100, SI dedicated to N. Movchan & A. Movchan  
 2022 *International Journal of Solids and Structures* Vol. 38, SI dedicated to H. Petryk  
 2018 *Journal of the European Ceramic Society* Vol. 38, Issue 8  
 2016 *Journal of the European Ceramic Society* Vol. 36, Issue 11  
 2015 *Geomechanics for Energy and the Environment* Vol. 4, SI dedicated to T. Hueckel  
 2014 *Journal of the European Ceramic Society*, Vol. 34, Issue 11  
 2013 *International Journal of Fracture*, Vol. 184, and of the companion volume: *Fracture Phenomena in Nature and Technology* (Springer)  
 2010 *International Journal of Fracture*, Vol. 166, and of the companion volume: *Recent Progress in the Mechanics of Defects* (Springer)

**Membership of Societies and related Activities**

2020 – Present Member, IUTAM Symposia Panel  
 2014 – Present Member, IUTAM General Assembly  
 2014 – 2022 Member, IUTAM Congress Committee  
 2008 – 2012 Secretary and Treasurer, International Society for the Interaction of Mechanics and Mathematics (ISIMM)  
 2013 – 2018 Member, Executive Committee, International Society for the Interaction of Mechanics and Mathematics (ISIMM)  
 2008 – 2012 Member, EUROMECH Solid Mechanics Conference Committee

**Referee Activities**

2026 Panel member, Severo Ochoa and Maria de Maeztu Programme, Spain  
 2026 Panel member, Postdoctoral Junior Leader fellowships, 'la Caixa' Foundation, Spain  
 2024 – Present Panel Member, *Electrical, Engineering, Metallurgy, Architecture, Transport Sciences*, Research Council of Hungary  
 2023 Vice Chair, Panel PE8 Products and Processes Engineering, *European Research Council (ERC) Starting Grants*  
 2021 – Present Panel Member, *European Research Council (ERC) Starting Grants*  
 2020 – Present Panel Member, *Swiss National Science Foundation*  
 2015 Panel Member, *Excellence Initiative funded by the Government of Spain*  
 2014 Panel Member, *Swiss National Science Foundation Starting Grants*  
 2013 Vice Chair, Panel PE8 Products and Processes Engineering, *European Research Council (ERC) Consolidator Grants*  
 2011 – 2013 Panel Member, PE8 Products and Processes Engineering, *European Research Council (ERC) Consolidator Grants*  
 2009 – 2010 Panel Member, PE8 Products and Processes Engineering, *European Research Council (ERC) Starting Grants*  
 2013 Panel Member, *Romanian National Council for Development and Innovation*

## **Ad Hoc Reviewer**

Reviewer for major international funding agencies and research institutions, including:

*NASA Solar System Workings (SSW) Program*  
*Isaac Newton Institute for Mathematical Sciences*  
*RDI Research Grant Program, Saudi Arabia*  
*Czech Science Foundation*  
*Chilean National Science and Technology Commission for Scientific and Technological Research*  
*Romanian National Council for Development and Innovation*  
*Deutsche Forschungsgemeinschaft (DFG)*  
*Deutsch-Italienisches Hochschulzentrum*  
*Engineering and Physical Sciences Research Council Research Grants (UK)*  
*Irish Research Council*  
*Research Council of Norway*  
*Technology Foundation STW of Netherlands.*  
*United States - Israel Binational Science Foundation*  
*Israel Science Foundation*  
*National Centre for Research and Development, Minister of Science and Higher Education (Poland)*  
*Russian Science Foundation (RSF).*  
*Italian PRIN (COFIN) MiUR and CIVR*  
*NATO Collaborative Research Grants*

## **Referee for International Journals**

Referee for leading international journals, including:

- *Journal of the Mechanics and Physics of Solids*
- *Nature*
- *Nature Communications*
- *Nature Materials*
- *Nature Physics*
- *Philosophical Magazine A*
- *Philosophical Transactions of the Royal Society A*
- *Physical Review Letters*
- *Proceedings of the National Academy of Sciences of the United States of America (PNAS)*
- *Proceedings of the Royal Society A*

and more than 150 international journals.

Referee for academic book publishers, including:

Cambridge University Press; CRC Press; Oxford University Press; Springer; Wiley; World Scientific Publishing

## **Plenary and Named Lectures (Selected)**

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|------|---|
| 2026 | 5th International Conference on Mechanics of Advanced Materials and Structures, Toulouse, France              |
| 2024 | Modelling, partial differential equations analysis and computational mathematics in material sciences, Prague |
| 2024 | XXVI Congresso AIMETA, Napoli   |

- 2024 19th European Mechanics of Materials Conference, Madrid
- 2023 XXIII Convegno GIMC X Convegno GMA II Convegno GBMA, Reggio Calabria
- 2022 13th International Congress on Mechanics HSTAM2022, Patras, Greece
- 2021 Signorini Lecture (RAM3, Roma)
- 2020 B. Karunes Memorial Lecture at the 65-th Congress of the Indian Society of Theoretical and Applied Mechanics, GITAM Hyderabad, India
- 2019 Engineering Mechanics Institute Conference, (EMI 2019), Pasadena, CA, USA
- 2017 International Symposium on Defects and Material Mechanics, Lyon
- 2016 11th Hellenic Society for Theoretical and Applied Mechanics International Congress, Athens
- 2016 The 40th Solid Mechanics Conference SOLMECH 2016, Warsaw
- 2016 INdAM Trends on Applications of Mathematics to Mechanics Sept. 5-9, Roma
- 2014 *STAMM 2014*, September 8-11, Potiers, FR
- 2010 *Advanced composite materials engineering COMAT 2010*, Brasov, Romania
- 2008 *XXII International Congress of Theoretical and Applied Mechanics*, Adelaide, Australia
- 2006 *35th Solid Mechanics Conference*, Kraków, Poland

### **Keynote and distinguished invited talks (Selected)**

- 2024 ICTAM2024 - 26th International Congress of Theoretical and Applied Mechanics, Daegu, Korea
- 2024 14th International Conference on Metamaterials, Photonic Crystals and Plasmonics, Toyama, Japan
- 2022 11th European Solid Mechanics Conference, Galway, Ireland
- 2021 ICTAM 2021 XXV International Conference of Theoretical and Applied Mechanics, Milan
- 2019 Midwest Mechanics Seminars, Tour B (invited multi-institution seminar series, Apr 1-5)
- 2019 XVI ECerS Conference 2019, June 16-20, Torino
- 2018 Mathematics and Mechanics: Natural Philosophy in the 21st Century, Oxford
- 2018 Midwest Mechanics Seminars, Tour A (invited multi-institution seminar series, Oct 29 – Nov 2)

### **Invited seminars (selected)**

- 2018 School of Engineering and Applied Sciences, Harvard University, USA (July 25)
- 2017 Engineering Department, University of Cambridge, UK (Dec 2017)
- 2014 Mathematical Institute, University of Oxford, UK (May 22)
- 2014 Department of Aerospace, California Institute of Technology, USA (Apr 25)
- 2014 Department of Mechanical Engineering, University of California at Berkeley, USA (Apr 18)

### **Congress and Symposium Leadership (Selected)**

- 2025 Co-organizer and Co-Chair, New horizons in Structural Mechanics, Elasticity, and Homogenization - to celebrate Professor JR Willis' 85th birthday", IMT Lucca
- 2024 Co-chairman, Thematic Session SM13, 26th International Congress of Theoretical and Applied Mechanics, ICTAM2024, Daegu
- 2023 Co-Chairmen and Co-Organizer, Mathematics and Mechanics of Solids and Structures, Aberystwyth

- 2018 Co-Chairman and Co-Organizer, 10<sup>th</sup> European Solid Mechanics Conference (ESMC 2018), Bologna
- 2017 Co-Chairman and Organizer, CERMODEL2017, Trento
- 2016 Co-chairman, special session in memory of Professor B. Raniecki, SOLMECH 2016, Warsaw
- 2015 Co-Chairman, Mini-Symposium Mechanics and Physics of Solids and Structures, 9<sup>th</sup> European Solid Mechanics Conference, Madrid
- 2015 Co-Chairman and Organizer, CERMODEL2015, Trento
- 2013 Co-Chairman and Organizer, CERMODEL2013, Trento
- 2012 Co-Chairman, Pre-nominated Session Elasticity, 23<sup>rd</sup> International Congress of Theoretical and Applied Mechanics, ICTAM2012, Beijing
- 2012 Co-Chairman and Co-Organizer, IUTAM 2012 Symposium Fracture Phenomena in Nature and Technology, Brescia
- 2009 Co-Chairman and Organizer, 4<sup>th</sup> International Symposium on Defect and Materials Mechanics (ISDMM09), Trento
- 2005 Co-Chairman, Euromech Colloquium 474 on Material instabilities in coupled problems, Troyes
- 2004 Co-Chairman, Pre-nominated Session on Material Instabilities, 21<sup>st</sup> International Congress of Theoretical and Applied Mechanics, ICTAM2004, Warsaw

### **Scientific and International Advisory Committees (Selected)**

International Advisory Boards (Selected)

- 2026 44th Solid Mechanics Conference (SolMech 2026)
- 2024 43rd Solid Mechanics Conference (SolMech 2024)

Scientific Committees (Selected)

- 2023 International Conference on Mechanics of Advanced Materials and Structures
- 2023 International Conference on Thin-walled Structures

Earlier service includes scientific committees of major Euromech, AIMETA, ISDMM, and IUTAM conferences.

### **Postgraduate Supervision**

Since 1993: supervision of 33 completed PhD students, 2 current PhD candidates, and 7 postdoctoral researchers. Alumni hold academic positions at leading international institutions and senior roles in industry and engineering practice.

### **Selected Academic Placements of Former PhD Students**

- Katia Bertoldi (PhD 2006) — Professor of Applied Mechanics, Harvard University
- Enrico Radi (PhD, 1993) Professor, University of Modena and Reggio Emilia
- Giovanni Noselli (PhD 2011) — Professor, SISSA, Trieste
- Massimiliano Gei (PhD 2001) — Professor, University of Trieste
- Michele Brun (PhD 2003) — Professor, University of Cagliari
- Andrea Piccolroaz (PhD 2004) — Professor, University of Trento

Diego Misseroni (PhD 2013) — Professor, University of Trento  
Federico Bosi (PhD 2015) — Associate Professor, University College London  
Sara Roccabianca (PhD 2011) — Associate Professor, Washington University in St. Louis  
Mattia Bacca (PhD 2013) — Associate Professor, University of British Columbia  
Francesco Dal Corso (PhD 2009) — Associate Professor, University of Trento  
Costanza Armanini (PhD 2018) — Assistant Professor, Khalifa University

### **Postdoctoral and Early-Career Academic Placements**

Gianluca Rizzi (PhD, 2019) — Postdoctoral Fellow, TU Dortmund  
Giovanni Bordiga (PhD 2020) — Postdoctoral Fellow, Harvard University  
Panagiotis Koutsogiannakis (PhD 2023) — Postdoctoral Fellow, University of Colorado Boulder  
Matteo Gaibotti (PhD 2023) — Postdoctoral Fellow, Tsinghua University  
Marco Amato (PhD 2024) — Postdoctoral Fellow, Czech Technical University

### **Postdoctoral Researchers Supervised (Selected)**

Panagiotis Gourgiotis — Postdoctoral Researcher (4 years), current position: Professor, National Technical University of Athens (NTUA)  
Andrea Bacigalupo — Postdoctoral Researcher (2 years), current position: Professor, University of Genova  
Ralf Denzer — Postdoctoral Researcher (2 years), current position: Associate Professor, Lund University  
Luigi Cabras — Postdoctoral Researcher (2 years), current position: Associate Professor, University of Trieste  
Yangkun Du — Marie Curie Fellow (2 years), current position: Assistant Professor, Zhejiang University  
Massimo Paradiso — Postdoctoral Researcher (2 years), current position: Postdoctoral Fellow, Nanyang Technological University, Singapore

### **Industry and Professional Leadership (Selected)**

Massimo Penasa (PhD 2017) — Co-founder, CAEmate  
Matthew Scott Swan (PhD 2017) — Researcher, Sandia National Laboratories  
Daniel Kempen (PhD 2019) — Engineer, Dassault Systèmes  
Summer Shahzad (PhD 2016) — Structural Engineer, Rambo

Additional alumni hold senior positions in engineering consulting, education, and applied research.

## **Research Grants and Contracts**

### **European Research Council Grants (Principal Investigator)**

2022–2027 ERC Advanced Grant Beyond hyperelasticity: a virgin land of extreme materials, Horizon Europe — Total funding: €2.47M  
2014–2019 ERC Advanced Grant Instabilities and nonlocal multiscale modelling of materials, FP7 — Total funding: €2.38M

### **Other European Union Grants**

2024–2026 MSCA Postdoctoral Fellowship (Supervisor), Dr Yangkun Du  
2014–2018 FP7-IRSES TAMER — Research Unit Coordinator  
2013–2017 FP7-CIG MeMic — Project Coordinator

2011–2014 FP7-IAPP INTERCER2 — Project Coordinator

### **National Competitive Grants (Italy)**

2017–2019 PRIN (MIUR) — Research Unit Leader

2011–2014 MIUR Cofin — Research Unit Leader

2007–2009 MIUR Cofin — Research Unit Leader

2006–2007 MIUR Cofin — Research Unit Leader

2004–2005 MIUR Cofin — Research Unit Leader

### **Fellowships and Early-Career Funding**

2004 CNR–NATO Fellowship (Supervisor)

2002–2005 MIUR Grant (with W.J. Drugan, University of Wisconsin–Madison)

### **Teaching Experience**

#### **Graduate and Undergraduate Teaching (1987–present)**

Theory and Design of Structures; Solid Mechanics; Nonlinear Elasticity; Large-Strain Elastoplasticity; Fracture Mechanics; Nonlinear theory of structures; Biomechanics.

2022 Instructor, CISM–IUTAM Advanced School Instability and Bifurcation Phenomena in Solids Including Coupled Field Phenomena, Udine

2017 Coordinator and Instructor, CISM–AIMETA Advanced School Dynamic Stability and Bifurcation in Nonconservative Mechanics, Udine

2014 Coordinator and Instructor, CISM Advanced School Extremely Deformable Structures, Udine

2012 Coordinator and Instructor, Computational Multiscale Fracture Mechanics Summer School, University of Brescia (EU project INTERCER2)

2006 Instructor, EPSRC Mathematics for Engineers Summer School, Durham University

2004 Instructor, Material Instabilities in Solid Mechanics, Graz University of Technology

2001 Instructor, Mechanical Behaviour of Advanced Ceramics, Institute of Fundamental Technological Research, Warsaw

1999 Instructor, CISM Course 414, Material Instabilities in Elastic and Plastic Solids, Udine

### **Outreach and Public Engagement**

2015 – Present Permanent exhibit “Elastica Arm Scale”, Museo della Bilancia, Campogalliano (Italy)

2010 – Present Scientific outreach through educational videos, Solids and Structural Mechanics Group YouTube channel

### **Public Lectures and Science Communication (Selected)**

2019 Leonardo da Vinci and the Science of Structures, Museo delle Scienze (MUSE), Trento

2019 The Work of Leonardo da Vinci as Inspiration for 21st Century Mechanics,

Istituto Italiano di Cultura, Mexico City

2019 Máquinas elásticas: de Leonardo da Vinci a la robótica,  
Festival de Ciencia Puerto de Ideas, Antofagasta (Chile)

2019 Da Vinci: Mechanical Harmony and Its Influence on Construction Science and Music  
Universidad Adolfo Ibáñez, Santiago (with G.F. Modugno)

2019 A 21st-Century Scientist in Conversation with Leonardo da Vinci,  
Istituto Italiano di Cultura, Santiago

Some lectures integrated live music performance as part of the scientific narrative.