

# **The building blocks of (nearly) everything: new measures derived from molecular structures to study innovation**

Proposal for a PDW at DRUID 2023, June 10, 2023 - 9:00 - 12:00

## **ORGANISERS**

**Elisa Giuliani** (University of Pisa)

**Arianna Martinelli** (Sant'Anna)

**Stefan Wagner** (ESMT Berlin)

## **AIM AND MOTIVATION**

Scholars have developed a wide range of indicators to measure innovation-related outcomes on different levels of aggregation and to characterise the underlying individual inventions in detail. Traditionally, these indicators are based on meta-information, such as bibliographic and legal data, on publicly available sources including scientific publications and patent documents. For instance, innovation output can be approximated by publication or patent counts. The scientific origins and the impact of inventions have been described as functions of the references they contain and the citations they receive (Trajtenberg, et al. 1997, Harhoff et al., 1999). Similarly, established measures relating inventions to each other are often based on comparing patterns of references and citations or their technical classifications (Jaffe et al. 1986). More recently, researchers started to apply advanced computational methods such as Natural Language Processing (NLP) and AI-based machine learning to derive more refined measures from the full text of patent documents (Balsmeier et al., 2018).

While having the advantage of allowing for comparisons across different technology fields, established measures, including the more recent text-based NLP and AI-based approaches, are not able to fully capture crucial information related to the most fundamental building blocks of virtually everything – i.e. molecular structures of chemical compounds. For documents that detail the molecular structure of (novel) chemical compounds, studying full texts is less informative than extracting the information contained in the molecular structure itself. Because materials used in all sectors, from manufacturing to agriculture, from paints to plastics, to agrochemicals, are based on chemical structures, the analysis of their intrinsic properties can be revealed in many ways. For instance, Biggi et al. (2022) have used computational toxicology to assess the toxic potential of molecules claimed in chemistry patents. These toxicity predictions regarding firms' innovation activities can inform the ongoing policy debates towards a zero pollution ambition for a toxic-free environment, also part of the European Green Deal's core objectives. Wagner et al. (2022) have exploited computational chemistry to identify how pharmaceutical companies use flexible notations to obtain patents potentially covering several billion molecules in a single patent filing. These broad patents are an effective means for companies to create patent fences around drugs to extend the duration of exclusivity. Other studies have also shown how the application of computational chemistry to chemical structures linked to companies' innovation activities can provide novel insights into the dynamics of R&D

trajectories. Most notably, Krieger et al. (2022) introduce a new measure of drug novelty based on chemical similarity and show that firms face a risk-reward trade-off: novel drug candidates are less likely to obtain FDA approval but are based on more valuable patents.

## OVERVIEW

The PDW will run over three hours and aims to host a maximum of 50 participants. It is organized in two parts. In the first part of the PDW, the four speakers will provide an overview of recent work that exploits chemical information and molecular structures in the study of innovation. After the first presentation has provided the context by discussing the current state-of-the-art of patent-based indicators, we will then not only cover available data sources and computational approaches (including AI-based methods from computational chemistry) in additional presentations. We will also discuss how important research questions related to innovation dynamics in the chemical and pharmaceutical industry can be studied using these previously unavailable indicators.

The second part of the PDW will be more interactive and engage the audience in a conversation to identify promising research questions and opportunities (e.g., in terms of data, methods, and co-authorships) and cross-pollination among distinct research areas. Inspired by the concept of creative collaboration, we aim at harnessing the power of diverse perspectives to tackle the important issues highlighted in the PDW. In the final part, we ask the panelists to identify intersections in cross-field questions and research opportunities deriving from the brainstorming session. The session moderators will facilitate the discussion.

A detailed outline of the PDW program is provided below.

### References:

- Balsmeier, B., Assaf, M., Chesebro, T., Fierro, G., Johnson, K., Johnson, S., Li, G.-C., Lück, S., O'Reagan, D., Yeh, B., Zang, G., Fleming, L. (2018). Machine learning and natural language processing on the patent corpus: Data, tools, and new measures. *Journal of Economics & Management Strategy* 27, 535-553.
- Biggi G., Giuliani E., Martinelli A., Benfenati E. (2022) Patent Toxicity, *Research Policy*, 51 (1), 104329.
- Harhoff, D., Narin, F., Scherer, F.M., Vopel, K. (1999). Citation frequency and the value of patented inventions. *Review of Economics and Statistics*, 81, 511-515.
- Jaffe, A. (1986). Technological Opportunity and Spillovers of R&D: Evidence from Firms' Patents, Profits, and Market Value. *American Economic Review* 76(5), 984-1001.
- Krieger, J., Li, D., Papanikolaou, D. (2022). Missing Novelty in Drug Development. *Review of Financial Studies*, 35 (2).
- Trajtenberg, M., Henderson, R. and Jaffe, A. (1997) University versus Corporate Patents: A Window on the Basicness of Invention. *Economics of Innovation & New Technology*, 5, 19-50.
- Wagner, S., Sternitzke, Ch., Walter, S. (2022). Mapping Markush, *Research Policy*, 51 (10), 104597.

## DETAILED PROGRAM

### **PART 1: PRESENTATIONS<sup>1</sup>**

MODERATOR: **Elisa Giuliani** (University of Pisa)

9:00 - 9:05: Welcome and introduction. **Elisa Giuliani** (University of Pisa)

9:05 - 9:35: *Current state-of-the-art of text-based patent indicators using natural language processing (NLP) and deep learning methods.* **Daniel Hain** (University of Aalborg)

9:35 - 10:00: *How to obtain data on chemical compounds claimed in patent documents - methodological approaches and pitfalls to be avoided.* **Stefan Wagner** (ESMT Berlin)

10:00 - 10:30: *Patent toxicity.* **Gianluca Biggi** (University of Pisa), **Arianna Martinelli** (Sant' Anna)

10:30 - 11:00: *Using chemistry-based indicators to tackle broader research questions.* **Joshua Krieger** (Harvard Business School)

11:00 - 11:20 Coffee Break

### **PART 2: COLLECTIVE DISCUSSION**

MODERATOR: **Arianna Martinelli** (Sant' Anna)

11:20 - 12:00: *New avenues for research - broader agendas in understanding scientific advances in the chemical and pharmaceutical industry.* Panellists: Daniel Hain, Stefan Wagner, Gianluca Biggi, Joshua Krieger, Elisa Giuliani.

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<sup>1</sup> For each presentation, 15 to 20 minutes are allocated to the presenter and 5 to 10 minutes to Q&As from the audience.

**CVs OF PRESENTERS**

# Gianluca Biggi

Place and date of birth: Massa (MS), Italy - 23 July 1992  
Dipartimento di Economia e Management, University of Pisa  
Via C. Ridolfi 10, 56127 Pisa (PI) Italy  
Cell phone: (+39) 392 9987470 | Email: [gianluca.biggi@ec.unipi.it](mailto:gianluca.biggi@ec.unipi.it)

## CURRENT POSITION

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**Department of Economics and Management, University of Pisa**  
Postdoctoral researcher

**Pisa, Italy**  
December 2021 – present

**Department of Economics and Management, University of Pisa**  
Responsible Management Research Center  
Member

**Pisa, Italy**  
November 2017 – present

## PAST POSITIONS

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**Department of Physics, University of Pisa**  
Lecturer – Principles of Economics and Management (3 ECTS)

**Pisa, Italy**  
November 2021 – January 2022

**Department of Economics and Management, University of Pisa**  
Research Assistant

**Pisa, Italy**  
May 2021 – October 2021

**Department of Science and Technology Studies, University College London**  
Visiting Researcher  
Supervisor: Prof. Jack Stilgoe

**London, UK**  
January 2020 – September 2020

## EDUCATION AND TRAINING

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**University of Pisa, University of Florence, University of Siena**  
Ph.D. in Business Administration and Management  
Supervisor: Prof. Elisa Giuliani

**Pisa, Italy**  
November 2017 – June 2021

**Department of Economics and Management, University of Pisa**  
Master of Science in Professional Business Consultancy

**Pisa, Italy**  
May 2015 - December 2016

**ISEG Lisbon School of Economics and Management**  
Exchange Programme, Erasmus

**Lisbon, Portugal**  
September 2013 - January 2014

**Department of Economics and Management, University of Pisa**  
Bachelor of Science in Business Administration

**Pisa, Italy**  
October 2011- December 2014

## RESEARCH GRANTS

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**University of Pisa**  
Scholarship 'Patent Toxicity: Moving Forward'

**Pisa, Italy**  
May 2021 – October 2021

**Academy of Management (AOM)**  
Scholarship for the ONE Doctoral Consortium of the 79<sup>th</sup> Annual Meeting of the AOM

**Boston, USA**  
August 2019

**University of Pisa**  
Regional Scholarship 'Pegaso'

**Pisa, Italy**  
November 2017 – March 2021

**Department of Computer Science, University of Pisa**  
Silicon Valley TVLP project

**Pisa, Italy**  
July 2017

**AWARDS**

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<b>Award for the Best Doctoral Dissertation using Intellectual Property Rights (IPRs)</b> AREA Science Park - Prize in memory of Bernardo Nobile	<b>January 2022</b>
<b>Best Reviewer for the 80<sup>th</sup> Annual Meeting of the Academy of Management</b> Organization & the Natural Environment Division	<b>August 2020</b>
<b>Nominee for the AIB - Aalto "That's Interesting Award!"</b> Academy of International Business	<b>May 2020</b>
<b>PhD+: Research Valorization, Innovation, Entrepreneurial Mindset</b> PhD+ Best Idea Award 2017	<b>May 2017</b>

**VISITING**

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<b>Department of Science and Technology Studies, University College London</b> Visiting Researcher	<b>London, UK</b> January 2020 – September 2020
<b>Sloan School of Management, Massachusetts Institute of Technology</b> Short visiting period	<b>Boston, USA</b> June 2018
<b>Silicon Valley's Business School</b> Technology entrepreneurship and innovation programme	<b>Menlo Park, USA</b> July 2017

**SLECTION OF COURSES AND SUMMER SCHOOLS**

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<b>Summer School for Data &amp; Algorithms on ST&amp;I Studies</b> Application of AI/ML algorithms on IP (patents, trademarks, designs, copyrights)	<b>Leuven, Belgium</b> 21-23 September 2022
<b>Technology, Policy and Pathways to Possible Worlds: Imagining Year 2050 Now</b> Mini course on innovation theory and scenario analysis	<b>Brighton, UK</b> 3 December 2020
<b>Summer School for Data &amp; Algorithms on ST&amp;I Studies</b> Application of AI/ML algorithms on IP (patents, trademarks, designs, copyrights)	<b>Leuven, Belgium</b> 16-18 September 2020
<b>Department of Laws, UCL</b> Intellectual Property Rights (IPRs) and Competition Law	<b>London, UK</b> January 2020 – September 2020
<b>Department of Science, Technology, Engineering and Public Policy, UCL</b> Development, Technology and Innovation Policy	<b>London, UK</b> January 2020 – September 2020
<b>Department of Science, Technology, Engineering and Public Policy, UCL</b> Risk Assessment and Governance	<b>London, UK</b> January 2020 – September 2020
<b>ETH Academy on Sustainability and Technology</b> PhD Academy	<b>Zürich, Switzerland</b> 23 – 28 June 2019
<b>Department of Economics and Management, University of Pisa</b> Course of Advanced Econometrics	<b>Pisa, Italy</b> February 2019 – May 2019
<b>Institute of Economics, Sant'Anna School of Advanced Studies</b> Course of Microeconometrics – Panel Data	<b>Pisa, Italy</b> October 2018 – February 2019

**Italian Econometric Association (SIde)**  
Postgraduate course of Econometrics

**Bertinoro, Italy**  
July 2018

**The Dutch Research School of Philosophy (Ozsw)**  
Philosophy of Responsible Innovation

**Delft and Wageningen, The Netherlands**  
January 2018

**Institute of Economics, Sant'Anna School of Advanced Studies**  
Economics of Innovation

**Pisa, Italy**  
March 2018 – April 201

**Athenaeum Language Center, University of Pisa**  
Academic English, skillful writing, and presentation

**Pisa, Italy**  
January 2018 – April 2018

## **ORGANIZATION OF CONFERENCES/WORKSHOPS**

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**Zooming in Chemical and Pharmaceutical Patent Content: Frontier Methods and Data**  
Workshop organized with ESMT Berlin and Sant'Anna School of Advanced Studies  
Head of the organizing committee

**Pisa, Italy**  
11 May 2022

**Building REsponsibility And Developing Innovative Strategies for Tackling Food Waste**  
Workshop organized with TIK Centre for Technology, Innovation and Culture (University of Oslo)  
Head of the organizing committee

**Pisa, Italy**  
5-6 May 2022

**'NEXT GEN' Lunch seminar series in Economics and Management**  
Member of the organizing committee

**Pisa, Italy**  
April 2019 - present

**Sinergie SIMA 2020 Conference**  
Coordinator of parallel sessions

**Pisa, Italy**  
7-8 September 2020

## **REFeree ACTIVITY**

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Referee for: *Research Policy* (2022); *Ecological Economics* (2022); *Industry & Innovation* (2020 and 2021); *Academy of Management ONE (Organizations and the Natural Environment) Division* (2020); *Academy of Management TIM (Technology and Innovation Management) Division* (2020 and 2021)

## **PUBLICATIONS**

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Biggi, G. (2022). Patent Toxicity. *Research Policy*, doi.org/10.1016/j.respol.2021.104329 (with Elisa Giuliani, Arianna Martinelli and Emilio Benfenati)

Biggi, G. (2021). Toxic Inventions: Geo temporal dynamics and firm level strategies in the chemical industry. *Doctoral dissertation*, available through ETD (Digital archive of theses discussed at the University of Pisa)

Biggi, G. (2021). The noxious consequences of innovation: What do we know? *Industry and Innovation*, doi:10.1080/13662716.2020.1726729 (with Elisa Giuliani)

Biggi, G. (2021). Asbestos, leaded petrol, and other aberrations: Comparing countries' regulatory responses to disapproved products and technologies. *Industry and Innovation*, doi:10.1080/13662716.2020.1830041 (with Alex Coad and Elisa Giuliani)

## **SUBMITTED ARTICLES, WORK IN PROGRESS AND WORKING PAPERS**

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Biggi, G. (2022). Assessing Policy Impact on Organizational Inventions: The Case of The Stockholm Convention. *Sinergie SIMA Conference proceedings*

Biggi, G. (2021). Living in a Poisonous World. The Geography of Inventions in the Pesticide Industry. *Revised and resubmitted to Regional Studies* (with Elisa Giuliani and Arianna Martinelli)

Biggi, G. (2021). Artificial Intelligence in Self-Driving Cars Research and Innovation: A Scientometric and Bibliometric Analysis. *Available at SSRN 3829897* (with Jack Stilgoe)

Biggi, G. (2020). What is Boiling in the Pot? On the Patent Toxicity of Globally Banned Chemicals. *Academy of Management Proceedings*, 2020(1), 11567. doi:10.5465/AMBPP.2020.11567 (with Elisa Giuliani and Arianna Martinelli)

## **TEACHING ACTIVITIES/GUEST LECTURES**

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**Department of Political Science, University of Pavia** **Pavia, Italy**  
Lecture title: The Noxious Consequences of Innovation: What do we know? 5 April 2022

**Department of Physics, University of Pisa** **Pisa, Italy**  
Lecturer – Principles of Economics and Management (3 ECTS) November 2021 – January 2022

**Escuela de Negocios y Administración Pública, University of Buenos Aires** **Online**  
Economía de la Tecnología (MSc in Economics) 13 November 2020  
Lecture title: Companies love innovation, but does the planet love it too?

**Department of Economics and Management, University of Pisa** **Pisa, Italy**  
Business and Society (MSc in Economics) 7 May 2019  
Lecture title: Innovation towards Grand Societal Challenges: Opportunities and Risks

**Department of Economics and Management, University of Pisa** **Pisa, Italy**  
Business and Society (MSc in Economics) 4 May 2018  
Lecture title: The social control of technology: The Collingrdige’s dilemma

## **SEMINARS, CONFERENCES AND WORKSHOPS**

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**6<sup>th</sup> Geography of Innovation Conference (GEOINNO2022)** **Milano, Italy**  
Paper presented: ‘Living in a Poisonous World. The Geography of Inventions in the Pesticide Industry’ July 2022

**Sinergie SIMA Management Conference 2022** **Milano, Italy**  
Paper presented: ‘Assessing Policy Impact on Organizational Inventions: The Case of the Stockholm Convention’ June 2022

**6<sup>th</sup> Global Conference on Economic Geography (GCEG Dublin 2022)** **Dublin, Ireland**  
Paper presented: ‘Living in a Poisonous World. The Geography of Inventions in the Pesticide Industry’ June 2022

**Department of Economics and Management – Università di Pavia** **Pavia, Italy**  
Paper presented: ‘Patent Toxicity’ May 2021

**80<sup>th</sup> Annual Meeting of the Academy of Management (AOM)** **Vancouver, Canada**  
Paper presented: ‘What is Boiling in the Pot? On the Patent Toxicity of Globally Banned Chemicals’ August 2020

**26<sup>th</sup> Annual SPRU PhD Forum** **Brighton, UK**  
Grand Challenges in Science, Technology and Innovation for Policy & Practice May 2020  
Paper presented: ‘What is Boiling in the Pot? On the Toxicity of Banned Chemical Inventions’

**5<sup>th</sup> Geography of Innovation Conference (GEOINNO2020)** **Stavanger, Norway**  
Paper presented: ‘What is Boiling in the Pot? On the Toxicity of Banned Chemical Inventions’ January 2020

**79<sup>th</sup> Annual Meeting of the Academy of Management (AOM)** **Boston, USA**  
ONE (Organizations and the Natural Environment) Doctoral Consortium August 2019  
Paper presented: ‘Patent dynamics of Dirty Dozen pesticides’



### **3<sup>rd</sup> Online Workshop on Industrial Dynamics and Innovation**

Paper Development Workshop (PDW) for the Special Issue of 'Industry & Innovation' on 'The Dark Side of Innovation'

Paper presented: 'The Noxious Consequences of Innovation: What we do know?'

**Online**  
1 July 2019

### **8<sup>th</sup> International Conference on Sustainability and Responsibility**

CASM and the Wittenberg Center for Global Ethics

Paper presented: 'The Noxious Consequences of Innovation: What we do know?'

**Cologne, Germany**  
November 2018

### **Understanding and Overcoming Roadblocks to Sustainability**

Harvard Business School

**Cambridge MA, USA**  
June 2018

### **ARCS Research Conference**

Alliance for Research in Corporate Sustainability

**Cambridge MA, USA**  
June 2018

### **24<sup>th</sup> Annual SPRU PhD Forum**

Science, Technology and Innovation for a World in Transition

Paper presented 'Patent dynamics of Dirty Dozen pesticides'

**Brighton, United Kingdom**  
May 2018

## **LANGUAGES**

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**Italian** (Native), **English** (IELTS Overall Band Score 7.0 – CEFR Level C1), **French** (Basic)

## **SOFTWARE AND PROGRAMMING**

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- Database: Aida, Orbis, Derwent World Patent Index, ChEMBL, SciFinder
- Statistical packages: STATA
- Applications: Office (LibreOffice), TEX, LATEX
- Code programming: Pajek, CiteSpace, Python (Pyautogui package)
- Spreadsheets: Excel

**Elisa GIULIANI**  
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Responsible Management Research Center  
University of Pisa  
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Phone (+39) 050-2216280 - Fax (+39) 050-541403  
E-mail [elisa.giuliani@unipi.it](mailto:elisa.giuliani@unipi.it)  
<http://elisagiuliani.it>

## **EXPERTISE**

Fields: Innovation studies, business and human rights, international business, international development.  
Research interests: Innovation; technological catching up; social and environmental responsibility of big and small-scale business; business and human rights strategies; responsible innovation; industrial clusters & global value chains; multinational enterprises & development.  
Fieldwork experience: Argentina, Chile, Costa Rica, Italy.

## **CURRENT POSITIONS**

### **University of Pisa**

Professor of Management (SECS-P08), Department of Economics and Management, (2016-current)  
Director and Founder, Responsible Management Research Center (REMARC) (2017-current)  
Pro-Rector for Sustainability and the Agenda 2030 (2022-current)

### **Scuola Superiore Sant'Anna**

Affiliate Professor, Istituto di Economia (2018-current)

### **PhD in Sustainable Development and Climate Change (PhD SDC), IUSS Pavia**

Member of the PhD Coordination Committee; in charge of Curriculum 2 "Socio-Economic Risk and Impacts" (2021-current)

## **PAST POSITIONS**

### **Bocconi University**

Department of Management and Technology, Visiting Professor (October 2019- October 2020)

### **Massachusetts Institute of Technology (MIT)**

Sloan School of Management, Visiting Fellow/Research Affiliate (10%) (MISTI Grant) (2017- 2018)

### **University of Pisa**

Member of the University Sustainability Committee (2019-2022)  
Associate Professor of Management (2011-2016)  
Assistant Professor (Ricercatore) (2006-2011)

### **University of Sussex**

Science Policy Research Unit (SPRU), Visiting Fellow (2006-2012);  
SPRU, ESRC Post-doctoral Fellow (2005)

### **European University Institute**

Robert Schuman Center for Advanced Studies, Jean Monnet Fellow (2004-2005)

## **QUALIFICATIONS (ASN Evaluations)**

Elisa qualified as Full Professor for SSD 13/B2 (Economia e Gestione delle Imprese) in 2012 and 2013. In 2012 she also obtained the qualification for Full Professor in SSD 13/A4 (Economia Applicata). She is currently Full Professor of Economia e Gestione delle Imprese at the University of Pisa.

## **EDUCATION**

### **SPRU, University of Sussex**

Ph.D. in Science and Technology Policy (2005)

Marie Curie Individual Fellowship (2001)

### **University of Pisa**

Ph.D. in Management and Financial Institutions (2003)

Degree (Laurea) with Honors in Management Studies (2000)

## **EDITORIAL SERVICE**

Editor, *Research Policy* (2020-current)

Associate Editor, *Research Policy* (2014-2019)

Member of the Editorial Board, *Business and Human Rights Journal* (2017- )

Member of the Editorial Board, *Economic Geography* (2017- )

Member of the Editorial Board, *Journal of Economic Geography* (2017- )

Member of the Editorial Review Board, *Management and Organization Review* (2016- )

Member of the Editorial Review Board, *Journal of International Business Studies* (2013- 2022)

Guest Editor, *Regional Studies* (2022); *Cambridge Journal of Regions Economy and Society* (2021); *Competition & Change* (2019); *Journal of World Business* (2017)

Member of the Editorial Board of *Innovation and Development* (Taylor & Francis) and of the Anthem Press' Series on Innovation and Development.

## **AWARDS**

2023 Nominee for Best Paper Award – Industry & Innovation

2021 Top 100,000 worldwide scientist - PLOS Biology (Ioannidis et al.) ranking

2020 Highly Commended Paper Emerald Literati Awards

2020 Nominee for the Best Paper Award - Journal of World Business

2020 Nominee for the Academy of International Business (AIB) Aalto “That’s Interesting Award!”

2018 Regional Studies Association (RSA) Member - MERSA Award

2017 Best Reviewer Award - Journal of Economic Geography

2014 Danny van den Bulcke Prize for Best Paper- European Academy of International Business

2013 Best Paper Pres. Award 2013 Sustainable Business Conference - British Association of Management

2010 Academy of Management Best Reviewer Award - Social Issues in Management (SIM)

2005 The DRUID Young Scholar Best Paper Award - Copenhagen Business School

## **FULL LIST OF VISITING PERIODS**

Department of Management and Technology, Bocconi University (2019-2020)

Istituto di Economia, Scuola Superiore Sant’Anna (2020)

Science-PO Toulouse (2019)

MIT Sloan School of Management, Cambridge, United States (2017-2018)

Centre for Transformative Innovation, Swinburne University, Melbourne, Australia (2015)

CIRCLE, Lund University, Sweden (2013-2016)

SPRU, Sussex University, UK (2006-2012)

Fundación CENIT, Buenos Aires, Argentina (2011)

Universidad Autonoma Metropolitana, Mexico City, Mexico (2008)

Fundación CENIT, Buenos Aires, Argentina (2007)

Facultad de Economía, Universidad de Chile, Santiago, Chile (2006)

Universidad General Sarmiento, Buenos Aires, Argentina (2005)

CINPE, Universidad Nacional de Costa Rica, San José, Costa Rica (2004)

CEPAL, United Nations, Santiago de Chile, Chile (2002)

SPRU, University of Sussex, Brighton, UK (2001)

ECIS, University of Eindhoven, Eindhoven, The Netherlands (2001)

## GRANTS AWARDED

(selection)

2022-2025 **Horizon Europe** (Coordinator)

Title: Rebalancing disruptive Business in multinational corporations and global value chains within a democratic and inclusive citizenship process (REBALANCE)

2019-2022 **Norwegian Research Council**

Title: Building Responsibilities And Developing innovative strategies for tackling food waste (BREAD)

2020-2022: **Progetti di Ricerca di Ateneo (PRA), UNIVERSITY OF PISA (P.I.)**

Title: Shaky Capitalism: How business and finance respond to global threats

2019-2020 **Fondazione Finanza Etica (P.I.)**

Title: Accountability targets: How to measure human rights impacts in the financial sector

2019-2020: **Regional Studies Association MERSA Grant (P.I.)**

Title: Rethinking regional development agendas: Human rights and economic growth into perspective

2017-2019: **Progetti di Ricerca di Ateneo (PRA), UNIVERSITY OF PISA (P.I.)**

Title: Means-end decoupling: Communication, strategies and sustainability practices in global and local firms

2017-2018: **MISTI, UNIPI-MIT (P.I.)**

Title: Global value chains and the socio-environmental challenges of local development processes

2015-2016 **Progetti di Ricerca di Ateneo (PRA), UNIVERSITY OF PISA (P.I.)**

Title: Emerging market multinationals and their socio-environmental conduct. What impacts for Europe?

2011-2014 **Volkswagen Foundation (EUROPE AND GLOBAL CHALLENGES)**

Title: The challenge of globalization: Technology driven foreign direct investment (TFDI) and its implications for the negotiation of International (bi and multilateral) Investment Agreements

2008-2010 **PRIN (Italian Ministry of Education and Research)**

Title: The internationalization process of emerging countries

## OTHER ROLES

2020-current

Member of the Scientific Committee of the Ente Parco Regionale Migliarino, San Rossore, Massaciuccoli

2019- current

Member of Rennes Business School International Scientific Committee

Elisa has been member of Faculty Evaluation Committees at Copenhagen Business School (CBS) (2020, 2021); Koç University (2022) and member of Master/PhD Evaluation Committees at Utrecht University (2019), Science Po Toulouse (2021), University of Stavanger (2020), University of Amsterdam (2022), CBS (2022). She has been member of the *Regional Studies Association* Research Committee (2020-2022).

## MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

Academy of International Business (AIB); Regional Studies Association (RSA); Academy of Management (AOM). Conferences she regularly attends/has attended most frequently: AIB, AOM, EIBA, DRUID, IABS, GEOINNO.

## **INVITED SPEAKER/ACADEMIC SEMINARS**

2023

INGENIO, University of Valencia (Keynote Speaker)

2022

Manchester Business School (Seminar)

Saïd Business School University of Oxford (Invited Speaker)

University of Manchester (Seminar)

University of Siena (Seminar)

University of Oxford (Panel Speaker)

2021

EIBA Annual Meeting (Plenary Panel Speaker)

University of Bath (Seminar)

RESINNREG Western Norway Applied Science University (Seminar)

Utrecht University, Urban Futures Seminars (Seminar)

Manchester CIB (Seminar)

Collegio Carlo Alberto (Seminar)

University Milano Bicocca (Seminar)

GSSI L'Acquila (Seminar)

RSAI-GSSI (Keynote Speaker)

European University Institute (Panel Speaker)

2020

CIRCLE, Lund University (Seminar)

Cattolica University (Seminar)

UNU-MERIT, United Nations University (Seminar)

RSA (Webinar)

Bocconi University (Brown Bag Seminar, MNT)

2019

Tsinghua University, ICC Conference, Beijing (Invited Speaker)

Herrenhausen Conference "The New Role of the State for the Emergence and Diffusion of Innovation",

Volkswagen Foundation (Hannover) (Plenary Panelist)

Twente University (Seminar)

2018

RSA Summer School (Invited speaker)

Rethinking Clusters, Florence University (Plenary Speaker)

DRUID Academy (Keynote)

2017

D'Amore-McKim School of Business, Northeastern University (Seminar)

Copenhagen Business School (Seminar)

AIB (UK & I Chapter) (Panelist)

2015

European Meeting of Applied Evolutionary Economics, MERIT, Maastricht (NL) (Keynote)

Reading-UNCTAD AIB Conference (Panelist)

2014

Geography of Innovation Annual Conference, Utrecht (NL) (Keynote)

CIRCLE 10th Anniversary, Lund (SWEDEN) (Keynote)

Pre-2013:

Cambridge University (2012, Keynote); Fondazione Enrico Mattei (2011, Keynote); SPRU, University of Sussex (2011: Seminar); Universidad Miguel Hernández de Elche (2011; Keynote); University of Catania (2011, (Keynote); Sant'Anna School of Advanced Studies (2010; Seminar); University of Bologna (2009; Seminar); Imperial College London (2008; Seminar); University of Padua (2008; Seminar); Universidad

Autonoma Metropolitana (2008; Seminar); Utrecht University (2008; Seminar); University of Cambridge (2008; Seminar); Fundacion CENIT Argentina (2007; Seminar); Eindhoven University (2007; Seminar); Max Plank Institute of Economics (2007; Seminar); Lund University (2006; Seminar); University of Cambridge (2006; Keynote); Universidad Autonoma Metropolitana Mexico City (2006; Keynote); Utrecht University (2006; Seminar); Wits Business School South Africa (2005; Keynote).

## **INTERNATIONAL ORGANIZATIONS AND POLICY EVENTS**

(Invited Speaker, selection)

2018

OECD-INADEM Workshop "Building business linkages that boost SME productivity" (Mexico City, MEXICO)

2017

European Week of Regions and Cities, "The regional dimension of inequality: territorial responses in a rapidly changing economic environment", EU Commission (Brussels, BELGIUM).

United Nations Conference on Trade and Development (UNCTAD) - AIB panel on "Multinational Enterprises and Sustainable Development Goals" (Dubai, EMIRATES).

2016

Food and Agriculture Organization (FAO) Expert Group Meeting on "Sustainable Value Chain Development: Inclusiveness in Value Chain Development", organized at FAO – (Rome, ITALY)

2014

World Investment Forum United Nations Conference on Trade and Development (UNCTAD): "Shaping a New Policy Research Agenda. Multi-disciplinary Academic Conference" (Geneva, SWITZERLAND).

2011

Inter-American Development Bank (IADB) Workshop: "Methodologies for Impact Evaluation of Cluster Development Programs" (Washington DC, USA).

2010

United Nations Industrial development Organization (UNIDO) Expert Group Meeting on "Agro-food Value Chains in Asia" (Vienna, AUSTRIA).

2007

EU Think-Tank "Innovation and the Fight against Poverty, Hunger and Disease" (Rabat, MOROCCO). Trade and Invest, Ministry of Foreign Investment "Opportunity Export and Cluster Policies" (Kingston, JAMAICA) – Delegate for the United Nations Industrial Development Organization (UNIDO).

United Nations Industrial Development Organization (UNIDO) Expert Group Meeting on "Innovation Systems in Developing Countries" (Vienna, AUSTRIA). Meso-American Competitiveness Forum, World Bank "Mesoamerican Forum on Clusters and Productive Chains" (Tegucigalpa, HONDURAS).

2005

United Nations Economic Commission for Latin America and the Caribbean (ECLAC) "El Reto de Acelerar el Crecimiento Economico en America Latina" (Santiago de Chile, CHILE).

## **WORKSHOPS ORGANIZATION AND CONFERENCE SERVICES**

(recent selection)

2021

- Track co-chair European International Business Academy, (with A. Jaqueminet)

2020

- Member of the SIM (Societal Issues in Management) Academy of Management Annual Meeting Doctoral Consortium
- Co-chair of the SIMA-Sinergie Annual Conference (co-chaired with M. Frey)
- Member of the Junior Faculty Consortium, AIB Annual Meeting
- Co-organizer of the Geography of Innovation 2020 Panel "The Dark Side of Innovation in Times of Shifting Technological Paradigm" (co-organized with S. Iammarino)

2019

- *AIB Journal of International Business Studies* Paper Development Workshop
- *AIB Journal of International Business Studies* Paper Development Workshop Speaker ‘New grand challenges in IB research’
- *AIB Journal of Management Studies/Journal of World Development* Paper Development Workshop

2018

- Academy of Management Annual Meeting Professional Development Workshop “Business and Human Rights and Access to Justice: Theoretical Premises and Empirical Evidence” (with Kathleen Rehbein; Judith Schrempf-Stirling, Judith; Florian Wettstein; Michelle Westermann-Behaylo, Michelle; Tricia Olsen; Valentina Marano; Annie Snelson-Powell; and Michael Johnson-Cramer)
- Joint Sant’Anna-REMARC Workshop: “Intellectual property rights and human rights: Economic and policy challenges” (Invited Speakers: David Levine; Margaret Kyle)
- REMARC – EU Jean Monnet Workshop: “The other side of social responsibility. Private sector wrongdoing and the power of political connections” (Invited Speakers: Christopher B. Yenkey and Francesca Lotti)
- LAEMOS (Latin American Group of Organization Studies) Panel: “Organizational Upgrading and the Diffusion of International Standards in Emerging Markets” (with Gerald A. McDermott; Miguel Lengyel; Laszlo Bruszt and Carlo Pietrobelli)

2017

- AIB Annual Meeting, Track chair: “The contribution of MNEs to building sustainable societies”
- *Journal of International Business Studies* Paper Development Workshop
- Doctoral Consortium Speaker: “Research on Clusters in IB”
- EIBA, Track co-chair: “MNEs and sustainable development” (with Jonathan Doh)
- EIBA Panel on "Transition toward a Sustainable Economy: Opportunities and Challenges for MNEs" (with Anne Jacquemet; Christiane Bode; Daniel Shapiro and Maurizio Zollo)

## TEACHING

Elisa has been active in teaching at undergraduate and postgraduate levels since 2004. She has experience in teaching in several countries worldwide; besides Italy, she has held courses or participated in PhD training activities in the EU and Latin America. She is currently teaching International Management & Marketing (BSc Management for Business and Economics, University of Pisa) and Business & Society (MSc Economics, University of Pisa & Scuola Superiore Sant’Anna). Over the past 10 years, Elisa has collaborated with post-graduate teaching at the Scuola Superiore Sant’Anna, where she coordinates the module “Business and Human Rights” in the MA program “Human rights and conflict management”. Over her career, her courses have covered topics ranging from general management, economics and management of innovation, economic development, sustainable development, international business, business and society. At PhD level, she has taught research methods, social network analysis, evaluation of cluster policies. She regularly supervises undergraduate and post-graduate (Master) theses.

## PhD SUPERVISION

Marisol Manfredi (2022-current)

Thesis’ title: The dark side of innovation

PhD in Sustainable Development and Climate change (PhD SDC)

Verdiana Morreale (2021-current)

Project topic: Human rights defenders and CEO emotions

PhD in Sustainable Development and Climate change (PhD SDC)

Gianluca Biggi (2017- 2021)

Thesis: Toxic inventions: geo-temporal dynamics and firm level strategies in the chemical industry

PhD in Management, University of Pisa, Florence and Siena

*Winner of the Bernardo Nobile Award for Best PhD Thesis on patents*

*Nominee for Best Paper Award, Industry and Innovation*

Diletta Acuti (2016-2019) (co-supervised)

Thesis: Corporate Social Responsibility Communication

PhD in Management, University of Pisa, Florence and Siena

Federica Nieri (2014-2018)

Thesis: Corporate Social Irresponsibility and International Business

PhD in Management, University of Pisa, Florence and Siena

*Winner of the Academy of International Business (AIB) Best Dissertation Proposal Award*

Chiara Macchi (2011-2015) (co-supervised)

Thesis: "The Challenge of Preventing and Punishing Human Rights Abuses along Transnational Corporations' Supply Chains: Assessing the Potential of Voluntary and Binding Approaches in the Light of the UN "Protect, Respect, Remedy" Framework on Business and Human Rights.

PhD in "Politics, Human Rights and Sustainability", Sant'Anna School of Advanced Studies, Pisa.

Manuela Gussoni (2007-2010) (co-supervised)

Thesis: The Determinants of R&D Cooperation. Evidence from the Manufacturing and the Service sectors in Europe.

## PUBLICATIONS

### Peer reviewed journal articles:

1. Giuliani E., Nieri F., Vezzulli A. (2023). Big Profits, Big Harm? Exploring the Link Between Firm Financial Performance and Human Rights Misbehavior. *Business & Society*, 0(0).  
<https://doi.org/10.1177/00076503221144994>.
2. Corciolani M., Giuliani E., Humphreys A., Nieri F., Tuan A., Zajac E.J. (2022) Lost and Found in Translation: How Firms Use Anisomorphism to Manage the Institutional Complexity of CSR, *Journal of Management Studies*, <https://onlinelibrary.wiley.com/doi/full/10.1111/joms.12877>.
3. Cuervo-Cazurra A., Doh J.P., Giuliani E., Montiel I., Park J. (2002) The United Nations' Sustainable Development Goals: Pros and cons for managers of multinationals, *AIB Insights*, <https://doi.org/10.46697/001c.32530>.
4. Arza V., Nieri F., Giuliani E. (2022) R&D Investment under stress and uncertainty: The case of Argentina, *Innovation and Development*, forthcoming.
5. Balland P.A., Broekel T., Diodato D., Giuliani E., Hausmann R., O'Clery N., Rigby D. (2022) The New Paradigm of Economic Complexity, *Research Policy*, 51 (3); 104450.
6. Biggi G., Giuliani E., Martinelli A., Benfenati E. (2022) Patent Toxicity, *Research Policy*, 51 (1), 104329.
7. Maghssudipour A., Balland P.A., Giuliani E. (2021) Cast apart by the elites: how status influences assortative matching in industrial clusters, *Industry and Innovation*, 1-24.
8. Coad A., Biggi G., Giuliani E. (2021) Asbestos, leaded petrol, and other aberrations: comparing countries' regulatory responses to disapproved products and technologies, *Industry and Innovation* 28 (2), 201-233.
9. Biggi G., Giuliani E. (2021) The noxious consequences of innovation: what do we know? *Industry and Innovation* 28 (1), 19-41.
10. Giuliani E. (2020) Piketty, Thunberg, or Marx? Shifting ideologies in the COVID-19 bailout conditionality debate, *Journal of International Business Policy* 3 (4), 443-450.
11. Giuliani E., Tuan A., Calvimontes J. (2020) Creating Shared Values meets human rights? A sense-making perspective in small-scale firms, *Journal of Business Ethics*, 173, 489-505.



12. Fiaschi D., Giuliani E., Nieri F., Salvati N. (2020) How bad is your company? Measuring corporate wrongdoing beyond the magic of ESG measures, *Business Horizons*, 63 (3), 287-299.
13. Wettstein F., Giuliani E., Santangelo G., Stahl G. (2019) International Business and Human Rights: A research agenda, *Journal of World Business*, 54 (1): 54-65
14. Buhmann K., Taylor M.B., Giuliani E. (2019) Business and human rights in global value chains. *Competition and Change*, 23(4) 337–345.
15. Giuliani E., Balland P.A., Matta A. (2019) Straining but not thriving: Understanding network dynamics in underperforming industrial clusters, *Journal of Economic Geography*, 19 (1): 147-172.
16. Giuliani E., Nieri F. (2019) Fixing ‘bad’ capitalism: Why CSR and pro-good initiatives may not be enough, *Critical Perspectives on International Business*, forthcoming.
17. Giuliani E. (2019) Why multinational enterprises may be causing more inequality than we think, *Multinational Business Review*, 27(3): 221-225.
18. Amendolagine V., Giuliani E., Martinelli A., Rabellotti R. (2018) Chinese and Indian MNEs’ shopping sprees in advanced countries. How good is it for their innovation output? *Journal of Economic Geography*, 18 (5): 1149–1176.
19. De Marchi V., Giuliani E., Rabellotti R. (2018) Do Global Value Chains Offer Developing Countries Learning and Innovation Opportunities? *The European Journal of Development Research*, 30 (3): 389–407.
20. Giuliani E. (2018) Regulating global capitalism amid rampant corporate wrongdoing – Reply to “Three frames for innovation policy”, *Research Policy* 47 (9): 1577-1582
21. Giuliani E., Ciravegna L., Vezzulli A., Kilian B. (2017) Decoupling standards from practice: The impact of in-house certifications on coffee farms’ environmental and social conduct, *World Development*, 96: 294–314.
22. Fiaschi D., Giuliani E., Nieri F. (2017) Overcoming the liability of origin by doing no harm. Assessing emerging country firms’ social irresponsibility as they go global, *Journal of World Business*, 52 (4): 546-563.
23. Giuliani E., Santangelo G., Wettstein F. (2016) Human rights and international business research: A call for studying emerging market multinationals. *Management and Organization Review*, 12 (3), 631-637.
24. Giuliani E. (2016) Human Rights and Corporate Social Responsibility in Developing Countries’ Industrial Clusters, *Journal of Business Ethics*, 133 (1): 39-54.
25. Fiaschi D., Giuliani E., Nieri F. (2015) BRIC companies seeking legitimacy through Corporate Social Responsibility, *UNCTAD Transnational Corporations*, 22 (3): 5-42 (referenced back to 2013).
26. Giuliani E., Martinelli A., Rabellotti R. (2015) Is Co-Invention Expediting Technological Catch Up? A Study of Collaboration between Emerging Country Firms and EU inventors, *World Development*, 77: 192–205.
27. Amighini A., Cozza C., Giuliani E., Rabellotti R., Scalera V.G. (2015) Multinational enterprises from emerging economies: What theories suggest, what evidence shows. A Literature Survey. *Economia e Politica Industriale – Journal of Industrial and Business Economics*, 42(3), 343-37.
28. Giuliani E., Gorgoni S., Gunther C., Rabellotti R. (2014) Emerging versus advanced country MNEs investing in Europe: A typology of subsidiary global–local connections, *International Business Review* 23, 680-691.
29. Giuliani E., Macchi C. (2014) Multinational Corporations' Economic and Human Rights Impacts on Developing Countries: A Review and Research Agenda, *Cambridge Journal of Economics*, 38 (2), 479-517.
30. Giuliani E. (2013) Network dynamics in regional clusters: Evidence from Chile, *Research Policy*, 42 (8), 1406-1419.
31. Giuliani E. (2012) Clusters, networks and firms' product success. An empirical study, *Management Decision*, 51 (6): 1135 – 1160.
32. Molina-Morales FX., Giuliani E. (2012) The cluster model: whether and what developing countries should learn from advanced countries, *Int. J. Transitions and Innovation Systems*, 2 (3/4): 219-232.
33. Giuliani E., Rabellotti R. (2011) Universities in emerging economies: Bridging local industry with international science. Evidence from Chile and South Africa, *Cambridge Journal of Economics*, 36: 679-702.
34. Giuliani E. (2011) The Role of Technological Gatekeepers in the Growth of Industrial Clusters: Evidence from Chile, *Regional Studies*, 45 (10): 1329-1348.

35. Marin A., Giuliani E. (2011) MNC subsidiaries' position in global knowledge networks and local spillovers: Evidence from Argentina, *Innovation and Development* 1 (1), 91-114.
36. Giuliani E., Morrison A., Pietrobelli C., Rabellotti R. (2010) Who are the researchers that are collaborating with industry? An analysis of the wine sectors in Chile, South Africa and Italy, *Research Policy*, 39(6): 748-761.
37. Giuliani E., Arza V. (2009) What drives the formation of 'valuable' university-industry linkages? Insights from the wine industry, *Research Policy*, 38: 906-921.
38. Giuliani E. (2008) Multinational Corporations and patterns of local knowledge transfer in Costa Rican High-Tech industries, *Development and Change*, 39 (3): 385-407.
39. Giuliani E. (2007) The selective nature of knowledge networks in clusters: evidence from the wine industry, *Journal of Economic Geography*, 7: 139-168.
40. Dantas E., Giuliani E., Marin A. (2007) The Persistence of 'Capabilities' as a Central Issue in Industrialization Strategies: How They Relate to MNC Spillovers, Industrial Clusters and Knowledge Networks, *Asian Journal of Technology Innovation* 15 (2) (Special Issue in Honour of Martin Bell).
41. Giuliani E. (2007) The wine industry: persistence of tacit knowledge or increased codification? Some implications for catching-up countries, *International Journal of Technology and Globalisation*, 3 (2/3): 138 – 154.
42. Bell M., Giuliani E. (2007) Catching up in the global wine industry: innovation systems, cluster knowledge networks and firm-level capabilities in Italy and Chile, *International Journal of Technology and Globalisation*, 3 (2/3): 197:223.
43. Giuliani E. (2007) Toward an understanding of knowledge spillovers in industrial clusters, *Applied Economics Letters*, 14, 87-90.
44. Giuliani E. (2005) Cluster Absorptive Capacity: why some clusters forge ahead and others lag behind? *European Urban and Regional Studies*, 12 (3), 269-288.
45. Giuliani E., Pietrobelli C., Rabellotti R. (2005) Upgrading in global value chains: Lessons from Latin American clusters. *World Development* 33(4), 549-573.
46. Giuliani E., Bell M. (2005) The micro-determinants of meso-level learning and innovation: evidence from a Chilean wine cluster. *Research Policy* 34(1), 47-68.

#### **Book chapters:**

1. Giuliani E., Jaqueminet A., Nieri F. (2021) Bringing Light to Dark Spots: The Case of Cross-border Bioprospecting, in Castellani D., Perri A., Scalera V., Zanfei A. (eds.), *Cross-Border Innovation in a Changing World*, Oxford University Press, pp. 324-345.
2. Macchi C., Giuliani E. (2018) Human rights and European business: The ILVA case, in Suder G., Riviere M., Lindeque J. *The Routledge Companion to European Business*, Routledge.
3. Nieri F., Giuliani, E. (2018) International business and corporate wrongdoing: A review and research agenda. In D. Castellani, R. Narula, N. Quyen, I. Surdu, & W. Ames (Eds.), *Contemporary Issues in International Business: Institutions, Strategy and Performance*. Palgrave Macmillan.
4. Giuliani E., Rabellotti R. (2018) Italian Industrial Districts Today: Between Decline and Openness to Global Value Chains, In De Marchi, V., Di Maria, E., Gereffi, G. *Local clusters in global value chains: Linking actors and territories through manufacturing and innovation*, Routledge.
5. Giuliani E. (2017) Industrial clusters in global networks, In Bathelt, H.; Cohendet, P.; Henn, S. *The Elgar Companion to Innovation and Knowledge Creation: A Multi-Disciplinary Approach*, Edward Elgar.
6. Amendolagine V., Giuliani E., Martinelli A., Rabellotti R. (2017) Chinese MNEs bridging technologies across home and host regions, In McKelevey M.; Jin J. *Innovation and Globalization in the Chinese Entrepreneurial Eco-System: Creating and Improving Technological Capabilities in Chinese Companies*, Edward Elgar.
7. Giuliani E., Pietrobelli C. (2016) Social Network Analysis for Evaluating Cluster Development Programs, in Maffioli A., Pietrobelli C., Stucchi R. *The impact evaluation of cluster development programs: methods and practices*, Inter-American Development Bank, Competitiveness and Innovation Division, Washington DC, US, pp. 37-58.
8. Giuliani E., Matta A., Pietrobelli C. (2016) Networks, Cluster Development Programs, and Performance: The Electronics Cluster in Córdoba, Argentina, in Maffioli A., Pietrobelli C., Stucchi R. *The impact evaluation of cluster development programs: methods and practices*, Inter-American Development Bank, Competitiveness and Innovation Division, Washington DC, US, pp. 117-149.

9. Giuliani E., Macchi C., Fiaschi D. (2013) Corporate social irresponsibility in international business, in *International Business and Sustainable Development*, Ed. van Tulder R., Verbeke A., Strange R., Progress in International Business Research, Volume 8, European International Business Academy (EIBA)/Emerald, pp. 141-171.
10. Giuliani E., Molina-Morales X. (2012) Knowledge Spillovers and Innovation in Industrial Clusters in *Knowledge, Innovation and Internationalisation*, Ed. Morone P., Routledge.
11. Giuliani E., Perrone O., Daniele S. (2012) The Wine Industry in Bolgheri-Val di Cornia, Italy: Facing the crisis with success in *What Makes Clusters Competitive? Cases from the Global Wine Industry*, Ed. Hira A., McGill-Queen's University Press, Canada.
12. Giuliani E. (2011) Networks of innovation, in *Handbook on Regional Innovation and Growth*, Ed. Phil Cooke, Edward Elgar, Cheltenham: UK.
13. Giuliani E. (2010) Uneven development and spatial distribution of knowledge networks, in: *Handbook on Evolutionary Economic Geography*, Eds. Boschma R. and R. Martin, Edward Elgar, Cheltenham, UK.
14. Marin A., Giuliani E. (2007) Global and Local Knowledge Linkages: The case of MNC subsidiaries in Argentina, in *Do Multinationals Feed Local Growth and Development?* Eds. Piscitello L., and Santangelo G., Elsevier: Amsterdam.
15. Pietrobelli C., Rabellotti R., Giuliani E. (2007) Upgrading in global value chains: Lessons from Latin American clusters, in *Upgrading to Compete. Global Value Chains, Clusters, and SMEs in Latin America*, Eds. Pietrobelli C. and Rabellotti R., New York: Harvard University Press.
16. Ciravegna L., Giuliani E. (2007) MNC-dominated clusters and the upgrading of domestic suppliers: the case of Costa Rican electronics and medical device industries, Eds. Leoncini R., Montresor S. *Dynamic Capabilities between Firm Organization and Local Systems of Production*, Routledge.
17. Giuliani E. (2007) Networks and heterogeneous performance of cluster firms, Ed. Koen Frenken, *Applied Evolutionary Economics and Economic Geography*, Cheltenham UK: Edward Elgar.
18. Ciarli T., Giuliani E. (2005) Inversion extranjera directa y encadenamientos productivos en Costa Rica, Ed. M. Cimoli *Heterogeneidad estructural, asimetrías tecnológicas y crecimiento en América Latina*, Santiago de Chile: Naciones Unidas.

#### **Edited books:**

1. Giuliani E. (co-editors: Morrison A., Rabellotti R.) (2011) *Innovation and Technological Catch-Up: The Changing Geography of Wine Production*, Edward Elgar, Cheltenham: UK.
2. Giuliani E. (co-editors: Rabellotti R., van Dick M.P.) (2005) *Clusters Facing Competition: The Importance of External Linkages*, Aldershot: Ashgate.

#### **Working Papers/Blogs** (recent, excluding published papers):

1. Giuliani E. (2020) *Putting human rights into regional growth agendas: Where we stand and where we ought to go*, Papers in Evolutionary Economic Geography (PEEG) 2042, Utrecht University, Department of Human Geography and Spatial Planning, Group Economic Geography.
2. Giuliani E. (2020) *Human rights defenders vs. big corporations: A promising field of inquiry*, Business and Human Rights Journal Blog, [CambridgeCore blog](#).
3. Giuliani E. (2020) *Regional development facing global sustainability challenges*, [Regional Studies Association Ezine](#) Research Frontline.

#### **Publications in Italian:**

1. Giuliani E. (2018) Come trasformare le imprese per il mondo di domani, in Paolazzi L., Sylos Labini M., Gargiulo T. (ed). *Le sostenibili carte dell'Italia*, Venezia: Marsilio Editori.
2. Giuliani E. (2010) Distretti industriali, reti e comunità di knowledge worker: un'analisi empirica nel settore vitivinicolo cileno, *Finanza Marketing e Produzione*, XXVIII (1), 77-115.
3. Giuliani E., Marin A. (2008) Imprese multinazionali e trasferimento tecnologico: il caso delle sussidiarie in Argentina, in Bellini N., Calafati A.G. (a cura di), *Internazionalizzazione e Sviluppo Regionale*, Milano: Franco Angeli.
4. Giuliani E. (2007) Il concetto di 'rete efficiente': una comparazione internazionale dei rapporti tra Istituti di Ricerca Pubblica e Impresa nel settore del vino, in Salvini A. (a cura di), *Analisi delle reti sociali. Teorie, metodi, applicazioni*, Milano: Franco Angeli.

5. Ciarli T., Giuliani E., (2003) Dinamiche di Sviluppo Industriale: Network Locali e Buyer Globali nei Paesi in Via di Sviluppo, in Prodi G. (ed.), *Politiche Industriali in una Economia Aperta. Riflessioni per i paesi in via di sviluppo*, Milano: Franco Angeli.
6. Lanzara R., Giuliani E. (2002) Mass customization ed evoluzione progettuale del prodotto: un riesame teorico-empirico, *Finanza Marketing e Produzione*, XX (1): 118-140.

#### **Papers/Notes for International Organizations**

1. Coad A., Biggi G., Giuliani E. (2020) Asbestos, leaded petrol, and other aberrations: Comparing countries' regulatory responses to disapproved products and technologies, JRC Working Papers on Corporate R&D and Innovation, 2019-08, Joint Research Centre (Seville site).
2. Marchese M., Giuliani E., Salazar-Elena J.C., Stone I. (2019) Enhancing SME productivity. Policy highlights on the role of managerial skills, workforce skills and business linkages, OECD SME and Entrepreneurship Papers, doi.org/10.1787/f493861e-en.
3. Giuliani E., Rabellotti R. (2014) Italy: Key Issues and Policies, OECD Studies on SMEs and Entrepreneurship, OECD Publishing.
4. Rabellotti R., Giuliani E., Alexander R. (2014) Clusters in the Caribbean: Understanding their characteristics, defining policies for their development, VIII Americas Competitiveness Forum "The Human Imagination at Work", Trinidad & Tobago.
5. Giuliani E., Maffioli A., Pacheco C., Pietrobelli C., Stucchi R. (2013) Evaluating the Impact of Cluster Development Programs, IDB Publications 81539, Inter-American Development Bank, Washington DC.
6. Giuliani E., Matta A., Pietrobelli C. (2013) Impact Evaluation with Social Network Analysis Methods. Program for Supply Chain Development in the Province of Cordoba, Argentina. Prepared for the Inter-American Development Bank, Washington DC.
7. Giuliani E., Pietrobelli C. (2011) Social Network Analysis Methodologies for the Evaluation of Cluster Development Programs, IDB Publications 53978, Inter-American Development Bank, Washington DC.
8. Giuliani E. (2010) Social Network Analysis in the Implementation and Evaluation of Value Chain Development Programs, Note prepared for the Expert Group Meeting "From Analysis to Implementation: Experience in Pro-poor Value Chain Development in Asia", United Nations Industrial Development Organization, Vienna, 4th-6th October 2010.
9. Bell M., Arza V., Giuliani E., Marin A. (2008) Evolving role of multinational enterprises in Latin American and Caribbean innovation systems, Scoping Paper prepared for the International Development Research Center (IDRC), Canada.
10. Giuliani E. (2007) Examining UNIDO Initiatives in an Innovation Systems Perspectives: A comment, Note prepared for the Expert Group Meeting on "Innovation Systems in Practice, The Relevance for Industry in Developing Countries. Implications for UNIDO and its Development Partners", United Nations Industrial Development Organization, Vienna, 24th -25th October 2007.
11. Ciarli T., Giuliani E. (2005) Inversion extranjera directa y encadenamientos productivos en Costa Rica, Ed. M. Cimoli Heterogeneidad estructural, asimetrías tecnológicas y crecimiento en América Latina, Santiago de Chile: United Nations.

Note: This CV does not include information about university department services (e.g. evaluation committees; administrative and institutional duties, etc.)

# Daniel Hain

## Curriculum Vitae

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✉ [daniel.hain82@gmail.com](mailto:daniel.hain82@gmail.com)  
📄 [github.com/daniel-hain](https://github.com/daniel-hain)

### Current Position

- since 2020 **Associate Professor (Data Science & Innovation Economics)**, *Aalborg University Business School*, DK.  
Programme Co-Director M.Sc. "Business Data Science"  
Research Lead (Data Science) at the AI:Growth Lab  
Associated researcher, AI Pioneer Center, DK  
AI Implementation Consultant AI:DK  
Teaching & research on data science, machine learning, technology mapping & landscaping, AI industry dynamics, economics of technological change
- since 2020 **External Lecturer**, *Copenhagen Business School*, DK.  
Module coordinator "Data Science for Business Applications"
- 2016–2020 **Assistant Professor (Quant. Methods & Industry Dynamics)**, *Aalborg University*, DK.  
Teaching & research on applied econometrics, network analysis, and data science
- 2014 **Visiting Research Scholar**, *Stanford University*, US.  
Focus on networks analysis, complex systems, machine learning, natural-language-processing

### Professional Experience

- 2010–2011 **Research Assistant**, *Fraunhofer Institute for Industrial Engineering*, Stuttgart, DE.  
Information & knowledge management, business intelligence, process optimization and simulation
- 2009–2010 **Management Consultant**, *Mercedes Benz*, Stuttgart, DE.  
Supplier management and audit, process simulation and optimization

### Education

- 2015 **PhD. Economics**, *Aalborg University*, DK.  
Focus on network & complex system analysis, applied econometrics, energy system dynamics
- 2012 **M.Sc. Economics**, *Aalborg University*, DK.  
Course: Innovation Economics
- 2012 **M.Sc. Int. Business & Economics**, *University of Hohenheim*, DE.  
Course: International Business and Economics
- 2009 **Dipl.-Wirt.-Ing.**, *University of Stuttgart*, DE.  
Course: Industrial Engineering, specialization on process optimization and simulation

### Honors & Awards

- 2018 **Winning team of the 1<sup>st</sup> OECD & EUIPO "Big Data Analytics Challenge"**, *Intellectual Property Statistics for Decision Makers (IPSDM) Conference 2018*, Alicante, ES, [4].
- 2017 **Best paper in track "International HRM and cross-cultural issues"**, *European International Business Academy (EIBA) conference 2017*, Milan, IT, [6].
- 2013 **Best paper in track "Venture Capital, Finance, and Regulation"**, *Institute for Small Business and Entrepreneurship (ISBE) conference 2013*, Cardiff, UK, [8].

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## Projects, Grants & Funding

- Since 2020 **AI:DK**, *role: core project team*, funded by: Danish Industry Foundation, total amount: 5 mio. EUR.  
National strategic funding for AI competence development in industry. My responsibilities include the supervision and coordination of AI application pilots in companies, and the development of an AI e-learning platform.
- 2019 **PatExplore Proof-of-Concept**, *role: project lead*, funded by: AAU Innovation & Technology Transfer Office, total amount: 75.000 EUR.  
Technology-Transfer Grant. Our team develops a proof-of-concept for an AI powered patent search and landcaping software solution based on patent full-text.
- 2019 **ReachAAUT**, *role: project co-lead*, funded by: AAU Social Sciences Faculty, total amount: 75.000 EUR.  
Internal strategic funding. Our teams builds capacities and provides guidance for modern digital research dissemination.
- 2019 **China-EU cooperation activities in AI industry research**, *role: project lead*, funded by: Sino Danish Center, total amount: ca. 100.000 EUR.  
Collaboration and activity funding. Facilitated multiple projects aiming at collaborative research with Chinese researchers on AI industry dynamics and the application of data science methods for technology system mapping. Co-funded the two PhD. students supervised by me.
- 2014 **SCANCOR Stanford Scholarship**, *Role: Grant receiver*, funded by: Scandinavian Consortium for Organizational Research.  
Mobility grant which facilitated my research fellowship at Stanford University.
- 2012-2015 **Strategic Alliance on Energy Innovation Systems (EIS)**, *role: project team*, funded by: Danish Council for Strategic Research, total amount: 3 mio. EUR.  
National strategic funding for energy innovation system mapping. My responsibilities included sub-modules in "WP 1: Indicators of energy innovation systems"

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## Academic Citizenship (Selected Activities)

- 2021 **Editorial Board**, *Asian Journal of Economics and Banking*, .  
Member of the Editorial Board
- 2021 **Organizer & Speaker**, *DRUID summer conference*, Copenhagen, DK.  
Special Session on "Industrial dynamics in the Age of AI"
- 2021 **Guest-Editor**, *Industry & Innovation*.  
Special Issue on on "Challenging fundamentals of innovation dynamics in the age of AI"
- 2020 **Lead Guest-Editor**, *Scientometrics*.  
Special Issue on on "Machine learning and artificial intelligence for science, technology, innovation mapping and forecasting"
- 2020 **Organizer & Speaker**, *ISS conference*, Rome, IT.  
Special Session on "The Economics of AI"
- 2018 **Organizer & Speaker**, *DRUID summer conference*, Copenhagen, DK.  
Professional Development Workshop on "Data Science and Machine Learning for Innovation Studies"
- 2018 **Organizer & Speaker**, *ISS conference*, Seoul, KR.  
Special Session on "AI, Data Science and Machine Learning for Industry Dynamics Research"

## Teaching Portfolio

### Graduate Level

- Since 2022 **M. Sc. Business Data Science**, *Program founder, director, and main lecturer*, Aalborg University Business School, M.Sc. full degree programme.  
Founder and main coordinator of the Business Data Science programme.
- Since 2021 **Technology Literacy and Digitalisation in Organisations**, *lecturer*, Aalborg University Business School, M.Sc. elective, 5 ECTS.  
Lectures on the fundamentals of machine learning and artificial intelligence for data driven decision making and business models
- Since 2020 **Data Science for Business Applications**, *module coordinator, main lecturer*, Copenhagen Business School, M.Sc. elective, 15 ECTS.  
Applied introduction to machine learning, network analysis, natural language processing
- Since 2020 **Managing the industrial revolution**, *guest lecturer*, Maastricht University, M.Sc., 5 ECTS.  
Module on the use of machine learning for policy analysis
- Since 2020 **Unstructured Data Analysis**, *guest module coordinator, main lecturer*, Strasbourg University, M.Sc. Data Science (Econ.), 5 ECTS.  
Applied introduction to network analysis and natural language processing for economists
- Since 2019 **Innovation Systems and Government-Business Relation**, *lecturer*, Sino Danish Center, M.Sc. Innovation Management, 10 ECTS.  
Lecture series on applied and data-driven innovation system mapping, network analysis, scientometrics
- Since 2018 **Social Data Science**, *founder, semester coordinator, main lecturer*, Aalborg University, M.Sc. interdisciplinary, 30 ECTS.  
Specialization semester, providing an applied introduction to machine learning, network analysis, natural language processing, and deep learning
- 2016-2019 **Scientific Methods II - Applied Econometric**, *Module coordinator, main lecturer*, Aalborg University, M.Sc. Innovation Economics, 5 ECTS.  
Advanced applied econometrics for innovation economists

### Undergraduate Level

- 2017-2020 **Corporate Finance**, *module coordinator, main lecturer*, Aalborg University, B.Sc. International Business, 10 ECTS.  
Theory & practice of firm valuation, financial decision making

### Supervision

- Since 2019 **PhD. student supervision**, Aalborg University.  
Main supervisor (Ivan Nechaev), co-supervisor (Eskil Anderson)
- Since 2014 **student supervision**, Aalborg University, B.Sc. & M.Sc..  
Frequent supervision of students for semester projects, bachelor & master theses

### Other teaching activities (selected)

- Since 2020 **Social Data Science winterschool**, *organizer & main lecturer*, Aalborg University, PhD. students, 4 ECTS.  
Annual 1-week applied introduction to data science for social science researchers
- 2019 **Data Science for Business Leaders workshop**, *organizer & main lecturer*, Sino Danish Center, Beijing, CN, professionals.  
1-day intuitive high-level introduction to machine learning for management professionals at the SDC "Corporate Innovation Days"
- 2018 **Africalics Innovation & Development summerschool**, *organizer & main lecturer*, University of Marrakech, MA, PhD. students, 2 ECTS.  
3-day module on "Data Science for Innovation Studies and Development Economics"

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## Publications

### Journal Articles

- [1] Daniel S. Hain, Jacob Holm, Roman Jurowetski, and Edward Lorenz. Challenging the fundamentals of innovation dynamics in the age of ai: Introduction to the special issue. *Industry & Innovation*, (forthcoming), 2023.
- [2] Daniel S. Hain, Roman Jurowetzki, Yuan Zhou, and Sungjoo Lee. Machine learning and artificial intelligence for science, technology, innovation mapping and forecasting: Review, synthesis, and applications. *Scientometrics*, pages 1–8, 2023.
- [3] Daniel S. Hain and Roman Jurowetzki. Introduction to rare-event predictive modeling for inferential statisticians – a hands-on application in the prediction of breakthrough patents. *Asian Journal of Banking and Finance*, (forthcoming), 2023.
- [4] Daniel S Hain, Roman Jurowetzki, Tobias Buchmann, and Patrick Wolf. A text-embedding-based approach to measuring patent-to-patent technological similarity. *Technological Forecasting and Social Change*, 177:121559, 2022.
- [5] Daniel S. Hain, Roman Jurowetzki, Primoz Konda, and Lars Oehler. From catching up to industrial leadership: Towards an integrated market-technology perspective. *Industrial and Corporate Change*, 29(5):1233–1255, 2020.
- [6] Daojuan Wang, Daniel S Hain, Jorma Larimo, and Li T Dao. Cultural differences and synergy realization in cross-border acquisitions: The moderating effect of acquisition process. *International Business Review*, page 101675, 2020.
- [7] Marija Rakas and Daniel S Hain. The state of innovation system research: What happens beneath the surface? *Research Policy*, 45(9):1–26, 2019.
- [8] Daniel S. Hain and Jesper L. Christensen. Capital market penalties to radical and incremental innovation. *European Journal of Innovation Management*, 52:793–814, 2019.
- [9] Jesper L. Christensen, Daniel S.. Hain, and Letícia A. Nogueira. Joining forces: collaboration patterns and performance of renewable energy innovators. *Small Business Economics*, 52(4):793–814, 2019.
- [10] Daniel S. Hain and Roman Jurowetzki. Local competence building and international venture capital in low-income countries: Exploring foreign high-tech investments in kenya's silicon savanna. *Journal of Small Business and Enterprise Development*, 25(3):447–482, 2018.
- [11] Daniel S. Hain, Tobias Buchmann, Muhamed Kudic, and Matthias Müller. Endogenous dynamics of innovation networks in the german automotive industry: analysing structural network evolution using a stochastic actor-oriented approach. *International Journal of Computational Economics and Econometrics*, 8(3-4):325–344, 2018.
- [12] Jesper L. Christensen and Daniel S. Hain. Knowing where to go: the knowledge foundation for investments in energy innovation. *Energy Research & Social Science*, 25:124–133, 2017.
- [13] Daniel S. Hain, Sophia A. Johan, and Daojuang Wang. Determinants of cross-border venture capital investments in emerging and developed economies: The effects of relational and institutional trust. *Journal of Business Ethics*, 138(4):743–764, 2016.

### Book Chapters

- [14] Simon Bøgh, Daniel S Hain, Emil Blixt Hansen, Simon Buus Jensen, Torben Tvedebrink, and Roman Jurowetzki. Predictive analytics applications for small and medium-sized enterprises (smes)-a mini survey and real-world use cases. In *The Future of Smart Production for SME*. Springer, 2022.



- [15] Raphael M Martins, Eunkyung Park, Daniel S Hain, and Roman Jurowetzki. Mapping entrepreneurial ecosystem for technology start-ups in developing economies: An empirical analysis of twitter networks between start-ups and support organizations of nairobi's digital economy. In *Entrepreneurship, Technology Commercialisation, and Innovation Policy in Africa*, pages 55–97. Springer International Publishing, Cham, 2021.
- [16] Daniel S. Hain and Roman Jurowetzki. The potentials of machine learning and big data in entrepreneurship research—the liaison of econometrics and machine learning. In George Saridakis and Marc Cowling, editors, *Handbook of Quantitative Research Methods in Entrepreneurship*, page 176–220. Edward Elgar Publishing, 2020.
- [17] Daniel S. Hain and Roman Jurowetzki. Incremental by design? on the role of incumbents in technology niches. In Andreas Pyka and Uwe Cantner, editors, *Foundations of Economic Change: A Schumpeterian View on Behaviour, Interaction and Aggregate Outcomes*, pages 299–332. Springer International Publishing, Cham, 2017.
- [18] Roman Jurowetzki and Daniel S. Hain. Mapping the (r-) evolution of technological fields – a semantic network approach. In Luca M. Aiello and Dan McFarland, editors, *Social Informatics*, volume 8851 of *Lecture Notes in Computer Science*, pages 359–383. Springer International Publishing, Cham, 2014.
- [Reports, Working Papers & Preprints \(selected\)](#)
- [19] Daniel Hain, Roman Jurowetzki, and Mariagrazia Squicciarini. Mapping complex technologies via science-technology linkages; the case of neuroscience—a transformer based keyword extraction approach. *arXiv preprint arXiv:2205.10153*, 2022.
- [20] Hamid Bekamiri, Daniel S Hain, and Roman Jurowetzki. A survey on sentence embedding models performance for patent analysis. *arXiv preprint arXiv:2206.02690*, 2022.
- [21] Hamid Bekamiri, Daniel S. Hain, and Roman Jurowetzki. PatentSBERTa: A Deep NLP based Hybrid Model for Patent Distance and Classification using Augmented SBERT. *arXiv preprint*, page arXiv:2103.11933, September 2021.
- [22] Roman Jurowetzki, Daniel Hain, Juan Mateos-Garcia, and Konstantinos Stathoulopoulos. The Privatization of AI Research(-ers): Causes and Potential Consequences – From university-industry interaction to public research brain-drain? *arXiv preprint*, page arXiv:2102.01648, February 2021.
- [23] Matheus E. Leusin, Bjoern Jindra, and Daniel S. Hain. An evolutionary view on the emergence of Artificial Intelligence. *arXiv preprints*, page arXiv:2102.00233, January 2021.
- [24] Tobias Buchmann, Daniel Hain, Muhamed Kudic, and Matthias Müller. Exploring the evolution of innovation networks in science-driven and scale-intensive industries: New evidence from a stochastic actor-based approach. Technical report, IWH Discussion Papers, No. 1/2014, 2014.
- [25] Mads Borup, Antje Klitkou, Maj Munch Andersen, Daniel S Hain, Jesper Lindgaard Christensen, and Klaus Rennings. Indicators of energy innovation systems and their dynamics: A review of current practice and research in the field. Technical report, Energy Innovation Systems (EIS) Radar Reports, DTU, 2013.



**HARVARD | BUSINESS | SCHOOL**

February 28, 2023

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**EDUCATION**

- 2017                    PhD, MIT Sloan School of Management  
Dissertation:    Essays in Learning and Strategy in Research and Development  
Committee:      Pierre Azoulay (chair)  
                         Scott Stern  
                         Fiona Murray  
                         Alessandro Bonatti
- 2008                    B.A., Cornell University, Economics and Government

**HARVARD UNIVERSITY**

- 7/1/17 – present      Assistant Professor of Business Administration

**Teaching Assignments**

- 2021 – Present            Tough Tech Ventures, Second-year elective, Spring
- 2018 – 2021              The Entrepreneurial Manager, First-year required curriculum, Spring

**WORK EXPERIENCE**

- 2008-2011              Cornerstone Research, Boston, MA  
                         Economic and Litigation Consulting

**FELLOWSHIPS & GRANTS**

- 2016 – 2021      National Science Foundation, Science of Science & Innovation Policy (SciSIP) Grant  
“Collaborative Research: The Impact of Research Costs on the Direction of Scientific  
Discovery Frontier Tools & Applications” (with Jeffrey Furman, Florenta Teodoridis and  
Ajay Agrawal)

- 2016 Kauffman Dissertation Fellowship
- 2016 Value of Medical Research Fellowship, National Bureau of Economic Research
- 2014 Hammond, Krasner and Roberts Entrepreneurship Research Grant
- 2014 Sloan Foundation Research Grant Program on the Economics of Knowledge Contribution and Distribution (with Pierre Azoulay and Jeffrey Furman)
- 2011 – 2017 Ronald A. Kurtz Doctoral Fellowship, MIT Sloan

## AWARDS AND HONORS

- 2018 Technology and Innovation (TIM) Best Dissertation Finalist, Academy of Management
- 2018 London Business School Summer Finance Symposium Best Paper Award
- 2017 Red Rock Finance Conference Best Paper Award
- 2017 MIT Sloan Thesis Prize (First Place)

## PUBLICATIONS

### Journal Articles:

Krieger, Joshua L., Kyle R. Myers, and Ariel D. Stern. "How Important is Editorial Gatekeeping? Evidence from Top Biomedical Journals." Harvard Business School Working Paper, No. 22-011, September 2021. *The Review of Economics and Statistics* (forthcoming).

Krieger, Joshua, Xuelin Li, and Richard T. Thakor. "Find and Replace: R&D Investment Following the Erosion of Existing Products." *Management Science* (forthcoming).

Krieger, Joshua, Danielle Li, and Dimitris Papanikolaou. "Missing Novelty in Drug Development." *Review of Financial Studies* 35, Issue 2 (February 2022): 636-679.

Benmelech, Efraim, Janice Eberly, Dimitris Papanikolaou, and Joshua Krieger. "Private and Social Returns to R&D: Drug Development and Demographics." *AEA Papers and Proceedings* 111 (May 2021): 336–340.

"Trials and Terminations: Learning from Competitors' R&D Failures." *Management Science* 67, no. 9 (September 2021): 5525-5548.

Azoulay, Pierre, Alessandro Bonatti, and Joshua Lev Krieger. "The Career Effects of Scandal: Evidence from Scientific Retractions." *Research Policy* 46, no. 9 (November 2017): 1552-1569.

Krieger, Joshua Lev, Fiona Murray, J. Scott Roberts, and Robert C. Green. "The Impact of Personal Genomics on Risk Perceptions and Medical Decision-Making." *Nature Biotechnology* 34, no. 9 (September 2016): 912–918.

Azoulay, Pierre, Jeffrey L. Furman, Joshua Lev Krieger, and Fiona Murray. "Retractions." *Review of Economics and Statistics* 97, no. 5 (December 2015): 1118–1136.

## WORKING PAPERS

Krieger, Joshua Lev, Martin Watzinger, and Monika Schnitzer. "Standing on the Shoulders of Science." Harvard Business School Working Paper, No. 21-128, June 2021. **2<sup>nd</sup> round revise and resubmit, *The Strategic Management Journal***

Krieger, Joshua Lev and Ramana Nanda. "Are Transformational Ideas Harder to Fund? Resource Allocation to R&D Projects at a Global Pharmaceutical Firm." Harvard Business School Working Paper, No. 23-014, August 2022.

Frankel, Alex, Joshua Lev Krieger, Danielle Li, and Dimitris Papanikolaou. "Evaluation and Learning in R&D Investment." Working paper, January 2023.

[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4315940](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4315940)

Hammoudeh, Mosab, Joshua Krieger, and Jiajie Xu. "Dusting Off the Old Ones: Drug Licensing to Startups, Innovation Success and Efficiency." Working paper, December 2022.

[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4281957](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4281957)

## WORKS IN PROGRESS

Krieger, Joshua Lev, Kyle Myers and Oliver York. "Racing Towards the Sun: Learning and Herding in Solar Cell Development."

Krieger, Joshua Lev and Ramana Nanda. "Social Influence in Evaluating Innovation."

Dizon-Ross, Rebecca, Daniel Fehder, Yael Hochberg, Joshua Lev Krieger and Daniel Lee. "Accelerate Palestine: A Field Experiment in Entrepreneurship Training in the West Bank."

Krieger, Joshua Lev and Zakaria El Amrani El Idrissi. "Cloudy with a Chance of Blockbusters: R&D Consequences of Missed Product Forecasts."

Garfinkel, Jon, Mosab Hammoudeh, Joshua Lev Krieger, Xuelin Li and Richard Thakor. "Drug Development Shocks and Rival Bank Loans."

## TEACHING MATERIALS

### Cases and Teaching Notes:

Lerner, Josh and Joshua Lev Krieger. "In-Q-Tel: Innovation on a Mission." Harvard Business School Case 823-031 (August 2022) [23p].

Lerner, Josh and Joshua Lev Krieger. "In-Q-Tel: Innovation on a Mission." Harvard Business School Teaching Note 823-042 (August 2022) [20p].

Krieger, Joshua Lev, Abhishek Nagaraj, and James Barnett. "Tomorrow.io Goes to Space." Harvard Business School Case 822-005 (January 2022) [22p].

Krieger, Joshua Lev, Abhishek Nagaraj, and James Barnett. "Tomorrow.io Goes to Space." Harvard Business School Teaching Note 822-102 (March 2022) [19p].

Krieger, Joshua Lev, William R. Kerr, and Christian Godwin. "AppHarvest: Rebuilding the Appalachian Economy Through Agriculture." Harvard Business School Case 822-067 (November 2021) [25p].

Krieger, Joshua Lev, William R. Kerr, and Christian Godwin. "AppHarvest: Rebuilding the Appalachian Economy Through Agriculture." Harvard Business School Teaching Note 823-024 (August 2022) [21p].

Kluender, Raymond, Joshua Krieger, and Mitchell Weiss. "Biobot Analytics." Harvard Business School Case 821-045 (January 2021, Revised December 2021) [27p].

Kluender, Raymond, Joshua Krieger, and Mitchell Weiss. "Biobot Analytics." Harvard Business School Teaching Note 822-079 (March 2022) [17p].

"Catalys Pacific." Harvard Business School Case 821-035 (September 2020, Revised January 2021) [21p].

"Catalys Pacific." Harvard Business School Teaching Note 822-086 (January 2022 Revised March 2022) [12p].

Krieger, Joshua Lev, Christopher Stanton, and James Barnett. "Forecasting ClimaCell." Harvard Business School Case 820-044 (December 2019) [23p].

Krieger, Joshua Lev, Christopher Stanton, and James Barnett. "Forecasting ClimaCell." Harvard Business School Teaching Note 821-008 (December 2020, Revised March 2022) [15p].

Krieger, Joshua Lev, Tom Nicholas, and Matthew Preble. "The 'Wonder Drug' That Killed Babies." Harvard Business School Case 818-044 (November 2017) [28p].

### **Course and Module Notes:**

Krieger, Joshua Lev, and James Matheson. "Introduction to Tough Tech Ventures." Course note.

Krieger, Joshua Lev, and James Matheson. "Launching Tough Tech Ventures." Module note.

Krieger, Joshua Lev, and James Matheson. "Commercialization Frameworks for Tough Tech Ventures." Module note.

Krieger, Joshua Lev, James Matheson, and Russ Wilcox. "Intellectual Property in Tough Tech." Topic note.

Krieger, Joshua Lev, Tom Clan, and James Matheson, and Russ Wilcox. "Customer Discovery and Validation in Tough Tech." Topic note.

Krieger, Joshua Lev, and James Matheson. "Dual-Use Technologies and Support Ecosystem." Topic note.

## RESEARCH PRESENTATIONS

Nov 2023 Accounting Unit Seminar, Harvard Business School  
Jul 2022 Economics of Strategy Workshop, NYU Stern  
Jun 2022 International Conference on the Science of Science & Innovation, Washington D.C.  
May 2022 UCLA Pharmaceutical Economics Seminar  
Mar 2022 Novartis Institutes for Biomedical Research  
Feb 2022 Workshop on Pharma & IP, HEC Lausanne / Columbia University Online Conference  
Jan 2022 “Selecting Outlier Innovations,” ASSA Annual Meeting, Session Co-Organizer  
May 2021 Bates White Healthcare Conference  
Apr 2021 Stanford Law and the Biosciences Workshop  
Feb 2021 Workshop on Field Experiments in Strategy, Innovation, and Entrepreneurship  
Paper presenter at Duke, HBS, USCD, INSEAD online conference  
Nov 2020 McGill Organizational Behavior Seminar  
Sep. 2020 Haas School of Business, UC Berkeley PhD Innovation Seminar  
Aug 2020 AIEA-NBER Conference on Innovation and Entrepreneurship, Discussant  
Feb 2020 Utah Eccles School of Management  
Jan 2020 ASSA Annual Meeting; San Diego  
Aug 2019 AOM TIM Doctoral Research Development Workshop, Co-Organizer  
May 2019 Kellogg Healthcare Conference  
Mar 2019 BYU Utah Winter Strategy Conference, Park City Utah  
Jan 2019 ASSA Annual Meeting; Atlanta, “Trajectories of Innovation: Evaluation and Direction in R&D Project Selection,” Presenter  
Nov 2019 Georgia Tech, REER Conference; Atlanta, GA, Discussant  
Jan 2018 “Trajectories of Innovation: Evaluation and Direction in R&D Project Selection”,  
ASSA Annual Meeting; Philadelphia, PA, Session Chair and Presenter  
Dec 2017 NBER Entrepreneurship Winter Meeting  
July 2017 NBER Summer Institute: Aging  
July 2017 NBER Summer Institute: Innovation  
June 2017 DRUID 2017, PDW on “Direction of Innovation & Science,” NYU Stern  
May 2017 Munich Summer Institute, Max Plank Institute  
Jan 2017 Strategy Department, UCLA Anderson School of Management  
Jan 2017 Technology and Operations Management Unit, Harvard Business School  
Jan 2017 Strategy and Entrepreneurship, Cox School of Business, SMU  
Jan 2017 Strategy Unit, Harvard Business School  
Jan 2017 Management Department, Wharton  
Dec 2016 Entrepreneurial Management Unit, Harvard Business School  
Dec 2016 Management Division, Columbia Business School  
Nov 2016 Strategy and Entrepreneurship, UNC Kenan-Flagler Business School  
Nov 2016 Georgia Tech, REER Conference; Atlanta, GA  
Aug 2016 Academy of Management Annual Meeting; Anaheim, CA  
Symposium on “Driving the Direction of Innovation,” Session Chair and Presenter  
May 2016 Industry Studies Association Conference; Minneapolis, MN  
Feb 2016 MIT Sloan Healthcare & Bioinnovations Conference (Poster); Cambridge, MA  
Apr 2015 Consortium on Competitiveness and Cooperation (CCC); New York, NY  
Mar 2014 American College of Medical Genetics and Genomics Annual Meeting (Poster);  
Nashville, TN

## **OTHER TEACHING EXPERIENCE**

2022	Instructor, Endeavor, HBS Executive Education
2022	Instructor, Rock Summer Fellows, Workshops on Tough Tech
2019 – 2023	Instructor, Launching New Ventures, HBS Executive Education
2018 – 2021	Guest Lecturer/Instructor, Theoretical and Empirical Perspectives on Entrepreneurship, Harvard Business School
2018 – 2021	Guest Lecturer/Instructor, Theoretical and Empirical Perspectives on Entrepreneurship, Harvard Business School
2020	Guest Instructor, Venture Capital and Private Equity, HBS 2nd year elective
2015, '18, '20	Guest Lecturer/Instructor, Ethics in Biomedical Research, Harvard-MIT Health Sciences and Technology Program
2016	Teaching Assistant, Entrepreneurial Strategy, MIT Sloan (Prof. Scott Stern)
2015	Teaching Assistant, Regional Entrepreneurship Acceleration Lab, MIT Sloan (Profs. Fiona Murray and Phil Budden)
2014 – 2015	Teaching Assistant, Competitive Strategy, Executive MBA Program, MIT Sloan (Profs. Pierre Azoulay and Scott Stern)
2013	Teaching Assistant, Advanced Strategic Management, MIT Sloan (Prof. Michael Cusumano)

## **PEER REVIEWER**

*American Economic Review*  
*Administrative Sciences Quarterly*  
*Health Economics*  
*Industry and Innovation*  
*Journal of the European Economic Association*  
*Journal of Finance*  
*Journal of Law, Economics and Organization*  
*Journal of Public Economics*  
*Management Science*  
*Organization Science*  
*Production and Operations Management*  
*Quarterly Journal of Economics*  
*RAND Journal of Economics*  
*Research Policy*  
*Review of Financial Studies*  
*Review of Economics and Statistics*  
*Review of Economics Studies*  
*Strategy Science*  
*Science Translational Medicine*

# ARIANNA MARTINELLI

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## Current Position

Nov. 2019- Present     **Institute of Economics, Scuola Superiore Sant'Anna, Pisa, Italy**  
Associate Professor in Applied Economics (s.s.d. SECS-P/06 – Economia applicata)

## Research Interests

Economics of IPR, measuring innovation (in particular using patent and citation data), interplay between IPR and technological standards, industrial dynamics of high-tech sectors.

## Previous Appointments

Nov. 2016 - Nov. 2019     **Institute of Economics, Scuola Superiore Sant'Anna, Pisa, Italy**  
Assistant Professor (Tenure Track) - Ricercatore a tempo determinato ai sensi dell'articolo 24, comma 3, lett. B della legge 240/2010

Jan. 2015 - Nov. 2016     **IBIMET-CNR, Florence, Italy**  
Research Fellow in the research project "Products complexity and economic performance: from countries to firms" under the supervision of Prof. Dosi at the Scuola Superiore Sant'Anna.

Dic. 2012 - Dic. 2014     **Institute of Economics, Scuola Superiore Sant'Anna, Pisa, Italy**  
Post doctoral fellow (Assegnista di ricerca) in the project "The challenge of globalization: Technology driven foreign direct investment (TFDI) and its implications for the negotiation of International (bi and multilateral) Investment Agreements" funded by the Riksbank Foundation

Nov. 2010 - Nov. 2012     **Institute of Economics, Scuola Superiore Sant'Anna, Pisa, Italy**  
Post doctoral fellow

July 2012 - Nov. 2012     **Télécom Ecole de Management, Paris, France**  
Visiting researcher within the ECOPATENT project funded by ADEME (Agence de l'environnement et de la Maîtrise de l'énergie)



Feb. 2009 - Nov. 2010 **GSBC - EIC The Economics of Innovative Change, Friedrich-Schiller-University, Jena, Germany**  
Post doctoral fellow

## Education

Feb. 2005 - June 2010 **ECIS (Eindhoven Centre for Innovation Studies) Eindhoven University of Technology, The Netherlands**

Ph.D. Student in Economics of technological change. Dissertation: "The dynamics of technological discontinuities: a patent citation network analysis of telecommunication switches" (supervisors: B. Verspagen, A. Nuvolari and B. Sadowski)

Sept. 2003 - Sept. 2004 **SPRU (Science and Technology Policy Research) - University of Sussex, Brighton, United Kingdom**

Master in Industry and Innovation Analysis. Dissertation: "University-Industry Technological Transfers: The case of Sussex University" (supervisors: N. von Tunzelmann and M. Meyer)

Sept. 1997 - July 2003 **Università Bocconi, Milan, Italy**

First Degree (Master Equivalent) in Economics and Social Science. Dissertation: "Innovation, Knowledge and Corporate Finance: An Empirical Analysis" (supervisors: F. Malerba and L. Bottazzi)

Feb. 2001 - July 2001 **Pontificia Universidad Catholica de Chile, Santiago**

Exchange Program. Courses: International Economics, Econometrics, Development Economics, and Corporate Finance (MBA course)

## Publications

Bekkers, R., Catalini, C., Martinelli, A., Righi, C., & Simcoe, T. (2023). Disclosure rules and declared essential patents. *Research Policy*, 52(1), 104618. doi: <https://doi.org/10.1016/j.respol.2022.104618>

Capponi, G., Martinelli, A., & Nuvolari, A. (2022). Breakthrough innovations and where to find them. *Research Policy*, 51(1), 104376. doi: <https://doi.org/10.1016/j.respol.2021.104376>

Biggi, G., Giuliani, E., Martinelli, A., & Benfenati, E. (2022). Patent toxicity. *Research Policy*, 51(1), 104329. doi: <https://doi.org/10.1016/j.respol.2021.104329>

Fontana, R., Martinelli, A., & Nuvolari, A. (2021). Regimes reloaded! a reappraisal of schumpeterian patterns of innovation, 1977–2011. *Journal of Evolutionary Economics*, 31(5), 1495–1519. doi: [10.1007/s00191-021-00735-6](https://doi.org/10.1007/s00191-021-00735-6)

Bekkers, R., & Martinelli, A. (2021, 05). 506C32A Network Analysis Approach to Intellectual Property Research. In *Handbook of Intellectual Property Research: Lenses, Methods, and Perspectives*. Oxford University Press. doi: [10.1093/oso/9780198826743.003.0033](https://doi.org/10.1093/oso/9780198826743.003.0033)

Amendolagine, V., Giuliani, E., Martinelli, A., & Rabellotti, R. (2020). Chinese multinational enterprises bridging technologies across home and host regions. In M. McKelvey & J. Jin (Eds.), *Innovative capabilities and the globalization of chinese firms* (p. 96-111). Edward Elgar Publishing.

Martinelli, A., Mina, A., & Moggi, M. (2021, 01). The enabling technologies of industry 4.0: examining the seeds of the fourth industrial revolution. *Industrial and Corporate Change*, 30(1), 161-188. doi: [10.1093/icc/dtaa060](https://doi.org/10.1093/icc/dtaa060)

- Bekkers, R., Martinelli, A., & Tamagni, F. (2020). The impact of including standards-related documentation in patent prior art: Evidence from an epo policy change. *Research Policy*, 49(7), 104007. doi: <https://doi.org/10.1016/j.respol.2020.104007>
- Cirillo, V., Martinelli, A., Nuvolari, A., & Tranchero, M. (2019). Only one way to skin a cat? heterogeneity and equifinality in european national innovation systems. *Research Policy*, 48(4), 905-922. (New Frontiers in Science, Technology and Innovation Research from SPRU's 50th Anniversary Conference) doi: <https://doi.org/10.1016/j.respol.2018.10.012>
- Capponi, G., Criscuolo, P., Martinelli, A., & Nuvolari, A. (2019). Profiting from innovation: Evidence from a survey of queen's awards winners. *Structural Change and Economic Dynamics*, 49, 155-169. doi: <https://doi.org/10.1016/j.strueco.2019.02.002>
- Amendolagine, V., Giuliani, E., Martinelli, A., & Rabellotti, R. (2018, 10). Chinese and Indian MNEs' shopping spree in advanced countries. How good is it for their innovative output? *Journal of Economic Geography*, 18(5), 1149-1176. doi: <https://doi.org/10.1093/jeg/lby049>
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- Giuliani, E., Martinelli, A., & Rabellotti, R. (2016). Is co-invention expediting technological catch up? a study of collaboration between emerging country firms and eu inventors. *World Development*, 77, 192-205. doi: <https://doi.org/10.1016/j.worlddev.2015.08.019>
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- Martinelli, A. (2011). *The dynamics of technological discontinuities: A patent citation analysis of the telecommunication switching industry*. Eindhoven, The Netherlands: Eindhoven University Press. doi: 10.6100/IR675978
- Martinelli, A., Meyer, M., & von Tunzelmann, N. (2008). Becoming an entrepreneurial university? a case study of knowledge exchange relationships and faculty attitudes in a medium-sized, research-oriented university. *The Journal of Technology Transfer*, 33(3), 259-283. doi: <https://doi.org/10.1007/s10961-007-9031-5>

## Working Papers

- Martinelli, A., Mazzei, J., & Moschella, D. (2022). *Patent disputes as emerging barriers to technology entry? empirical evidence from patent opposition* (Working Paper No. 2022/12). Laboratory of Economics and Management (LEM), Sant'Anna School of Advanced Studies, Pisa, Italy. Retrieved from <https://www.lem.sssup.it/WPLem/2022-12.html>
- Martinelli, A., Nuvolari, A., Palagi, E., & Russo, E. (2022). *Digitalization, copyright and innovation in the creative industries: an agent-based model* (Working Paper No. 2022/03). Laboratory of Economics and Management (LEM), Sant'Anna School of Advanced Studies, Pisa, Italy. Retrieved from <https://www.lem.sssup.it/WPLem/2022-03.html>

- Iori, M., Martinelli, A., & Mina, A. (2021). *The direction of technical change in ai and the trajectory effects of government funding* (Working Paper No. 2021/41). Laboratory of Economics and Management (LEM), Sant'Anna School of Advanced Studies, Pisa, Italy. Retrieved from <https://www.lem.sssup.it/WPLem/2021-41.html>
- Martinelli, A., & Romito, E. (2019). *When authors become inventors: an empirical analysis on patent-paper pairs in medical research* (Working Paper No. 2019/32). Laboratory of Economics and Management (LEM), Sant'Anna School of Advanced Studies, Pisa, Italy. Retrieved from <https://www.lem.sssup.it/WPLem/2019-32.html>
- Bekkers, R., Catalini, C., Martinelli, A., Righi, C., & Simcoe, T. (2017). *Disclosure rules and declared essential patents* (Working Paper No. 23627). National Bureau of Economic Research. Retrieved from <http://www.nber.org/papers/w23627>
- Bekkers, R., Baron, J., Martinelli, A., Ménière, Y., Nomaler, O., & Pohlmann, T. (2014). *Selected quantitative studies of patents in standards* (Working Paper No. 626). PIE/CIS, Hitotsubashi University, Tokyo, Japan. Retrieved from <http://hermes-ir.lib.hit-u.ac.jp/rs/handle/10086/26727>
- Cantner, U., Guerzoni, M., & Martinelli, A. (2012). *Innovation and market dynamics: A two-mode network approach to user-producer relation* (Tech. Rep. No. 2012/09). Laboratory of Economics and Management (LEM), Sant'Anna School of Advanced Studies, Pisa, Italy. Retrieved from <https://www.lem.sssup.it/WPLem/2012-09.html>

## Ongoing Research

“From open warfare to strawman’s anonymity: Motives and strategies behind patent opposition at EPO”, with R. Bekkers (Eindhoven University of Technology) and J. Mazzei (Scuola Sant’Anna)

“Academic Discontent, Breach of Academic Values, and Behavior Towards Publishers: Survey Evidence on the use of Sci-Hub”, with Giulia Rossello (Scuola Sant’Anna)

“Death squad or quality improvement? The impact of introducing post-grant review on U.S. patent quality”, with J. Mazzei (Scuola Sant’Anna)

“COVID-19 emergency and on-line piracy: an empirical analysis”, with J. Mazzei (Scuola Sant’Anna), A. Nuvolari (Scuola Sant’Anna) and J. Poort (IViR, University of Amsterdam)

“The double effect of Medicine Patent Pool on Generic Competition in the market for HIV drugs”, with E. Romito and A. Mina (Scuola Sant’Anna)

“FDI and market entry: an empirical analysis using trademarks”, with E. Giuliani (University of Pisa) and C. Castaldi (Utrecht University)

Book chapter on “Technological Trajectories” in *Handbook of Research Methods and Applications in Industrial Dynamics and Evolutionary Economics* edited by U. Cantner, M Guerzoni, and S. Vannuccini

## Teaching experience

Academic year 2021-2022:

- “The microeconomics of market failure” Undergraduate course. (20 hours)
- “Innovation and IPRs” Phd course (12 hours)

- **“The Law and Economics of patents”** together with Prof. Caterina Sganga at Scuola Superiore Sant’Anna. Undergraduate course. (20 hours)
- **“The Law and Economics of Technological Innovation: Robotics and AI”** Phd Course within the activities of the Jean Monnet Centre of Excellence on the Regulation of Robotics and AI (EURA) (4 hours)
- **“Industrial Economics”** together with Prof. Tamagni. Master course (14 hours module on innovation)

Previous years:

- Invited lecture on **“Patent data and internationalization of innovative activities”** in the course of Economic Development hold by Prof. Roberta Rabellotti at Pavia University.
- **“Programming in Stata”** course held for the Dipartimento di Scienze Politiche in the academic year 2016-2017, Università di Pisa (10 hours)
- Invited lecture on **“Patent data and internationalization of innovative activities?”** for the academic year 2016-2017 in the course of Economic Development hold by Prof. Roberta Rabellotti at Pavia University.
- **“Introduzione a STATA”** for the academic year 2015-2016 at Scuola Superiore Sant’Anna. Undergraduate course.
- **“Economics of Innovation”** for the academic year 2014-2015 at Scuola Superiore Sant’Anna. Course for the join master program with University of Trento on Innovation Management.
- **“IPR and Technological Standards”** for the academic year 2013-2014, at Scuola Superiore Sant’Anna. Undergraduate course. Academic year 2007-2008:
- Teaching assistant for the course **“Economics of Innovation: use of network analysis for patent and citation data”**, 6 CFU taught by Prof. Alessandro Nuvolari at Eindhoven University of Technology. Undergraduate course.
- Teaching assistant for the course **“Technology and Growth”**, 6 CFU taught by Prof. Bart Verspagen, at Eindhoven University of Technology. Master course. Evaluations are available.

Certificate “Teaching in Higher Education” awarded by Eindhoven University of Technology

## PhD students supervision

- Julia Mazzei (first supervisor), ongoing
- Giovanna Capponi (co-supervision together with Prof. Nuvolari), now assistant professor at Utrecht University
- Elena Romito (first supervisor), now at the Bank of Italy

## Funds and Projects

- Project “Un’analisi empirica delle relazioni fra Data-Driven Innovation e performance d’impresa a livello regionale” (DDI-EMPIRICS) funded by Regione Toscana
- H2020 Project ReCreating Europe (PI Prof. C. Sganga), member of the Sant’Anna unit
- Subcontractor for project awarded by the Joint Research Council (JRC) of the European Commission has awarded to Dialogic innovatie & interactie vof (Ref.: JRC/SVQ/2018/B.6/0024/OC)
- Member of the Sant’Anna unit of the PRIN2017 (Protocollo 201799ZJSN) project granted in April 2019 and lead by Prof. Marco Vivarelli (Catholic University of Milan).
- Member of the Sant’Anna unit of the H2020 Project GROWINPRO (grant agreement No. 822781) started in January lead by Prof. Andrea Roventini.
- Member of the Sant’Anna unit of the H2020 Project ISIGROWTH (grant agreement No. 649186) in the period 2015-2017 and lead by Prof. Giovanni Dosi
- Member of the team that has been awarded the European Commission DG Enterprise “Study on industries dependent on standards and patent challenges and possible policy reactions” (January, 2013).
- 15,000 Euros for organizing (together with Alessandro Nuvolari and Önder Nomaler) an international workshop about "The Structure and Dynamics of Knowledge Networks" within the DIME Network of Excellence (all the details are available at: <http://www.dime-eu.org/knowledge-networks>).
- 95,000 Euros from DIME Network of Excellence (WP 2 RAL2) for a Project “User-Producer Networks, Technological Trajectories, and the Dynamics of Industries”. This project is a partnership with KITeS, Bocconi University, in particular. The research performed at the Friedrich Schiller Universität is about the telecommunication switching industry and heavily relies on the data collected during my PhD project.

## Selected participation and presentation at conferences and seminar

6<sup>th</sup> Copenhagen Conference on “Emerging Multinationals? Outward Investment from Emerging Economies”, Copenhagen (October 11-12, 2018); EPIP 2018 Conference, Berlin (September 5-7, 2018); DRUID18, Copenhagen (June 11-13, 2018); GEOINNO2018, Barcelona (January 31-February 2, 2018); EPIP 2017, Bordeaux, (September 4-6, 2018); DRUID17, New York (June 13-15, 2017); 10<sup>th</sup> European Meeting on Applied Evolutionary Economics (EMAE), Strasbourg (May 31- June 3, 2017); 16<sup>th</sup> International Schumpeter Society, Montreal (July 6-8, 2014); IP Statistics for Decision Makers, Wien, Austria (November 3-4, 2015) 5<sup>th</sup> Reading-UNCTAD International Business Conference, University of Reading, United Kingdom, (June 13-14, 2015); 7<sup>th</sup> EMAEE Conference, Maastricht University, Maastricht (June 1-3, 2015); 15<sup>th</sup> International Schumpeter Society, Jena (July 27-30, 2014); Conference on Micro Evidence on Innovation in Developing Economies, Santiago del Chile (November 7-8, 2013); 6<sup>th</sup> Annual Conference for the Academy of Innovation and Entrepreneurship, Oxford (August 29-30, 2013); 35<sup>th</sup> DRUID Conference, Barcellona (June 17-19, 2013); 6<sup>th</sup> EMAEE Conference, Sophia Antipolis, Nice (June 10-12, 2013); 4<sup>th</sup> International Workshop on Evolution of Technology and Standards, Hitotsubashi University, Tokyo (April 12-13, 2012); NBER Patents, Standards and Innovation Conference; Tucson (January 20-21, 2012), NBER Patents, Standards and Innovation Pre-Conference, Boston (7 May 2011); DIME Final Conference, Maastricht (April 6-8, 2011); 7<sup>th</sup> EMAEE Conference, Scuola Superiore Sant’Anna, Pisa (14-16 February 2011); 13<sup>th</sup> International Schumpeter Society, Aalborg (21-24 June 2010); DIME Workshop: Measuring, Mapping and Modelling Technical Change, Pisa (6-7 May 2010); DIME Conference: Organizing for Networked Innovation, Politecnico di

Milano, Milan (15-16 April 2010); DRUID Summer Conference, CBS, Copenhagen (17-19 June 2009); 12<sup>th</sup> International Schumpeter Society, Rio de Janeiro, (2-5 July 2008); 25<sup>th</sup> DRUID Summer Conference, CBS, Copenhagen (17-21 June 2008); 15th CCC Conference, Carnegie Mellon University, Pittsburgh (11-13 April 2008); DIME Grand Conference, Strasbourg (7-9 April 2008); CESPRI Seminar, Bocconi University (26th March 2008)

## Refereeing activity

*Management Science, Review of Industrial Organization, Research Policy, Industrial and Corporate Change, Industry and Innovation, Journal of Evolutionary Economics, Technological Forecasting and Social Change, R&D Management, Journal of Technology Transfer, Technology Analysis & Strategic Management, Journal of Industrial and Business Economics/Economia e Politica Industriale, Scientometrics.*

## Administration and academic services

- Member appointed by the Economics Institute to the general assembly of the “Centro di Competenza ARTES 4.0”
- Member of the admission committee for undergraduate students (year 2017)
- Member of the committee for the “colloqui di verifica” degli allievi del I e II anno dell’Area di Scienze Economiche e Manageriali academic year 2018-2019.
- Member of the electoral commission
- Nov. 2016-Mar. 2019: Elected member of the academic Senate.
- Nov. 2013-Nov. 2014: Elected member of the Ethical Committee of Scuola Superiore Sant’Anna.

## Languages and Computer skills

Italian (native speaker), English (fluent), Spanish (fluent), French (basic).

Scientific software: Stata, SPSS, Matlab, Ucinet, Pajek, R, MYSQL. Windows, MAC OS X, Latex.

# Stefan Michael Wagner

Last updated November 2022

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PERSONAL ◇ **Nationality:** German

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CURRENT EMPLOY-  
MENT ◇ **ESMT European School of Management and Technology**, Berlin.  
*Full Professor* since 2022  
*Director of Ph.D. Studies* since 2017  
*Associate Professor*, 2013 (with tenure since 2016) to 2022  
*Assistant Professor*, 2011 to 2012

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EDUCATION ◇ **Ludwig-Maximilians-University** LMU, Munich.  
*Habilitation*, (Dr. habil.), 2010.  
*Dissertation* (Dr. oec. publ.), 2005.  
*Master of Business Research* (MBR), 2004.  
*Diploma in Business Administration* (Dipl.-Kfm.), 2001.  
◇ **University of California**, Los Angeles, USA.  
Fulbright Scholar at the Graduate School of Economics (2001-2002).  
◇ **University UT1**, Toulouse, France.  
ERASMUS scholarship, studies in Economics (1998-1999).  
◇ **Dominicus-von-Linprun Gymnasium (High School)**, Viechtach.  
*Abitur* (1995).

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(VISITING) APPOINT-  
MENTS ◇ **Pontificia Universidad Catolica de Chile**, Santiago de Chile.  
Visiting Professor (2017, 2018, 2019).  
◇ **Berlin Centre for Consumer Policies**.  
Senior Fellow (since 2015, ongoing).  
◇ **University of Melbourne**, Australia.  
Visiting Fellow on invitation of the EU Centre for Shared Complex Challenges (2016).  
◇ **Hitotsubashi University**, Tokyo, Japan.  
JSPS Fellow at the IIR Institute of Innovation Research (2014).  
◇ **Yonsei University**, Seoul, Korea.  
Visiting Professor at the Business School of Yonsei University (2012).  
◇ **NUS National University Singapore**, Singapore.  
Visiting Scholar at the NUS Business School (2011).  
◇ **IPRIA Intellectual Property Research Institute Australia**, Melbourne.  
Visiting Scholar at the Intellectual Property Institute of Australia IPRIA (2009).  
◇ **Boston University/ NBER**, Boston, USA.  
Visiting Scholar at the Boston University and the National Bureau of Economic Research NBER (Cambridge, MA) (2005-2006).

- WORK EXPERIENCE
- ◇ **PhD candidate/ Post Doc**, Ludwig-Maximilians-University, Munich ('Wissenschaftlicher Mitarbeiter' 2002-2005, 'Wissenschaftlicher Assistent' 2006-2010).
  - ◇ **Member of the board (Vorstand)**, First Value AG, Straubing, Germany (2007 – present), Small business angel fund providing seed capital to start-up companies.
  - ◇ **Freelance consulting**, Munich, Germany (since 2004), Freelance consulting work for private and public sector clients including BMW, Cap Gemini, Handelsblatt, Kabel Deutschland and the German Federal Ministry for Education and Research.
  - ◇ **Summer Associate**, McKinsey & Company, Munich, Germany (Summer 2001).
  - ◇ **Visiting Associate**, The Boston Consulting Group, Düsseldorf, Germany (Summer 2000).
  - ◇ **Co-Founder and CEO**, career networks GmbH, Munich, Germany (2000 – 2005), Career fairs for law students in Germany.
  - ◇ **Internship**, KPMG, Munich, Germany (Summer 1999).
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- SCHOLARSHIPS AND PRIZES
- ◇ Japanese Society for the Promotion of Sciences, Bridge Scholar (2019)
  - ◇ Juergen Hauschildt Award, German Association for Business Research (2018)
  - ◇ Excellence in Refereeing Award: Research Policy (2017)
  - ◇ Fellowship of the EU Centre for Shared Complex Challenges, Melbourne (2016).
  - ◇ Japan Society for the Promotion of Science JSPS, Fellow (2014)
  - ◇ German Academic Exchange Service DAAD scholarships and travel grants (2005, 2009, 2011, 2014, 2018)
  - ◇ Outstanding Dissertation Award, Munich School of Management Alumni Association (2005)
  - ◇ Fulbright Scholarship (2001-2002)
  - ◇ German National Academic Foundation (1998-2001)
  - ◇ European Community (Erasmus) Scholarship (1998-1999)
- 

- PROFESSIONAL SERVICE
- ◇ **Editorial board membership**  
*Strategic Management Journal*  
*Strategy Science*
  - ◇ **EPIP (European Policy for Intellectual Property) Association**  
*President, 2018-2019.*  
*Organization of the 13<sup>th</sup> Annual Conference, 2018.*  
*Member of the Board, since 2017.*
  - ◇ **Berlin School of Economics/ BDPEMS**  
*Member of the Board, since 2017.*  
*Head of the Management Track of BSE's PhD program, since 2019.*
  - ◇ **ESMT European School of Management and Technology**, Berlin.  
*Director of Ph.D. studies, since 2017.*  
*Coordinator of Faculty Seminar Series, 2011 to 2014.*
  - ◇ **German Academic Association for Business Research (VHB)**  
Regular contribution to the association's PhD training program "ProDok", since 2009.
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- SKILLS
- ◇ C, HTML.
  - ◇ MS-Office, STATA, R/ S-Plus, SPSS, Matlab.
  - ◇ Fluent in English, French, German (native language).
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REFERENCES Available upon request.



PUBLICATIONS    ♦ **In international refereed journals:**

- Wagner, S., Sternitzke, Ch. and S. Walter (2022). Mapping Markush. *Research Policy* 51 (10): Article 104597.
- Gaessler, F. and S. Wagner (2022). Patents, data exclusivity and the development of new drugs. *The Review of Economics and Statistics* 104 (3): 571-586.
- Wagner, S. and M. Goossen (2019). The Upside of losing innovative employees to competitors. *Harvard Business Review*, July.
- Wagner, S. and M. Goossen (2018). Knowing me, knowing you: Inventor mobility and the formation of technology-oriented alliances. *Academy of Management Journal* 61 (6): 2026-2052.
- Wagner, S. and J. Runge (2018). Nothing is free: Data-driven optimisation unlocks freemium business models' real potential. *The European Business Review*, September/October: 47-50.
- Wagner, S., and S. Wakeman (2016). What do patent-based measures tell us about product commercialization? Evidence from the pharmaceutical industry. *Research Policy* 45(5): 1091-1102.
- Harhoff, D., G. von Graevenitz, and S. Wagner (2016). Conflict resolution, public goods and patent thickets. *Management Science* 62(3): 704-721.
- Wagner, S., K. Hoisl and G. Thoma (2014). Overcoming localization of knowledge – The role of professional service firms. *Strategic Management Journal* 35 (11): 1671-1688.
- von Graevenitz, G., S. Wagner, and D. Harhoff (2013). Incidence and growth of patent thickets: The impact of technological opportunities and complexity. *Journal of Industrial Economics* LXI (3): 521-563.
- Liegsalz, J., and S. Wagner (2013). Patent examination at the State Intellectual Property Office in China. *Research Policy* 42 (2): 552-563.
- von Graevenitz, G., S. Wagner, and D. Harhoff (2011). How to measure patent thickets: A novel approach. *Economics Letters* 111 (1): 6-9.
- Reitzig, M., and S. Wagner (2010). The hidden costs of outsourcing: Evidence from patent data. *Strategic Management Journal* 31(11): 1183-1201. (reprinted in *The economics of outsourcing*, ed. Leslie P. Willcocks, Mary C. Lacity, 696-715. Cheltenham: Edward Elgar)
- Wagner, S., and I. Cockburn (2010). Patents and the survival of Internet-related IPOs. *Research Policy* 39(2): 214-228.
- Reitzig, M., and S. Wagner (2010). Patently (un)clear. *Business Strategy Review* 21(1): 28-33.
- Wagner, S. (2010). Managerial succession and organizational performance: Evidence from the German soccer league. *Managerial and Decision Economics* 31(6): 415-430.
- Harhoff, D., and S. Wagner (2009). The duration of patent examination at the European Patent Office. *Management Science* 55(12): 1969-1984.
- Schulz, C., and S. Wagner (2008). Outlaw community innovations. *International Journal of Innovation Management* 12(3): 399-418. (reprinted in: *Perspectives on user innovation*, Series on Technology Management, ed. Stephen Flowers, Flis Henwood , 191-210. London: Imperial College Press)
- Wagner, S. (2008). Business method patents in Europe and their strategic use: Evidence from franking device manufacturers. *Economics of Innovation and New Technology* 17(3): 173-194.
- Czado, C., V. Erhardt, A. Min, and S. Wagner (2007). Zero-inflated generalized Poisson models with regression effects on the mean, dispersion and zero-inflation level applied to patent outsourcing rates. *Statistical Modelling* 7(2): 125-153.

- Jerak, A., and S. Wagner (2006). Modeling probabilities of patent oppositions in a Bayesian semiparametric regression framework. *Empirical Economics* 31(2): 513-533.
- ◇ **In refereed international conference proceedings:**
  - Harhoff, D., G. von Graevenitz, and S. Wagner (2014). A primer on conflict resolution, public goods and patent thickets. (*Best Paper Proceedings of the 2014 Academy of Management Meeting*)
  - Ermecke, R., P. Mayrhofer, and S. Wagner (2009). Agents of diffusion: Insights from a survey of Facebook users. *Proceedings of the 42nd Hawaii International Conference on System Sciences (HICSS 2009)*.
  - Jerak, A., and S. Wagner (2004). Semiparametric Bayesian analysis of EPO patent opposition. In: *COMPSTAT Proceedings in Computational Statistics*, ed. J. Antoch: 1263-1270. Heidelberg: Physica-Verlag, 2004.
- ◇ **In national refereed journals:**
  - Wagner, S. (2021). Patente - das schlechteste Anreizsystem für Innovationen, abgesehen von allen anderen? *ifo Schnelldienst* 08/2021: 6-9.
  - Süßmuth, B., and S. Wagner (2012). A market's reward scheme, media attention, and the transitory success of managerial change. *Jahrbücher für Nationalökonomie und Statistik (Journal of Economics and Statistics)* 232(3): 258-278.
  - Wagner, S. (2009). Reform der Einschränkung der Urheberrechte in Lehre und Forschung: Abschätzung von Zahlungsbereitschaften für flexibleren Zugang zu studienrelevanter Literatur. *zfbf - Schmalenbachs Zeitschrift für betriebswirtschaftliche Forschung* 61: 857-880.
  - Wagner, S. (2009). Patente in der Finanzindustrie: Terra Incognita. *Quarterly Journal of Economic Research (Vierteljahreshefte zur Wirtschaftsforschung)* 78(1): 156-166.
  - Wagner, S. (2007). Make-or-buy decisions in patent related services. *ZfB Zeitschrift für Betriebswirtschaft, Special Issue 4*: 47-68.
  - Jostarndt, P., and S. Wagner (2006). Kapitalstrukturen börsennotierter Aktiengesellschaften: Deutschland und USA im Vergleich. *Quarterly Journal of Economic Research (Vierteljahreshefte zur Wirtschaftsforschung)*, 75(4): 93-108.
  - Treptow, F., and S. Wagner (2005). Stock exchanges and issuers: A changing relationship. *Quarterly Journal of Economic Research (Vierteljahreshefte zur Wirtschaftsforschung)* 74(4): 125-139.
- ◇ **Other:**
  - Wagner, S. and T. Kraus (2021). Beantragung von Forschungszulagen nach dem Forschungszulagengesetz FZulG. *NWB Betriebswirtschaftliche Beratung*.
  - Wagner, S. (2020). (Nicht-)Finanzielle Renditen auf soziale Investments. In *High Impact Investing: Erfolgsfaktoren für die Finanzierung von Social-Entrepreneurship-Projekten*, edited by Fischl, B., 69-77. Munich: Realis Verlag.
  - Wagner, S. (2019). Losing employees to a rival company can have an upside. *HR Magazine, November 2019*.
  - Harhoff, D. and S. Wagner (2009). Regressionsanalyse. In *Theorien und Methoden der Betriebswirtschaft*, edited by Schwaiger, M. and A. Meyer, 477-490. Munich: Vahlen.
- ◇ **Monographs:**
  - Fischl, B., and S. Wagner (2016). Der perfekte Businessplan. 3<sup>rd</sup> ed. Munich, Beck Verlag.
  - Harhoff, D., B. Hall, G. von Graevenitz, K. Hoisl, and S. Wagner (2007). The strategic use of patents and its implications for enterprise and competition policies. Report to the European Commission, Tender ENTR/05/82, 2007.

- Wagner, S. (2006). Economic analyses of the European patent system. Wiesbaden: DUV Gabler. (Dissertation LMU Munich, 2005).
  - ◇ **Working papers and manuscripts in preparation or under review:**
    - Helmers, Ch., Iara, Al., Pape, L., Runge, J. and S. Wagner. Price Discrimination and Big Data: Evidence from a Mobile Puzzle Game. CEPR Discussion Paper DP16706. Available at [https://cepr.org/active/publications/discussion\\_papers/dp.php?dpno=16706](https://cepr.org/active/publications/discussion_papers/dp.php?dpno=16706) and [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3952016](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3952016). (under review)
    - Wagner, S., Hoisl, K. and J. Monroe. Me and I – Personality and inventive performance. (under review)
    - Li, X. and S. Wagner. The hidden-cost of complementary strategic alliances.
    - Rawley, E., Anders, P. and S. Wagner. The co-location and related diversification complementarity.
    - Trang, H. and S. Wagner. CEO compensation, risk-taking and innovation.
- 

REFEREE ◇ **Journals:**

Academy of Management Journal, Economic History Review, Economics of Innovation and New Technology, Industrial and Corporate Change, Industry and Innovation, Journal of Evolutionary Economics, Management Science (also Guest Associate Editor), Review of Industrial Organization, RAND Journal of Economics, Research Policy, Scandinavian Journal of Economics, Strategic Management Journal, Small Business Economics, Technovation, Zeitschrift für betriebswirtschaftliche Forschung.

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PRESENTATIONS  
AND  
SEMINARS  
(SINCE  
2012)

- ◇ **2022:**  
Scuola Superiore Sant'Anna, Pisa (invited).
- ◇ **2021:**  
Max-Planck-Institute Munich. Academy of Management Meeting, virtual. Strategic Management Society SMS 2021, virtual (accepted). EPIP 2021 (accepted). DRUID 2021 (accepted).
- ◇ **2020:**  
Academy of Management Meeting, virtual.
- ◇ **2019:**  
University of Mannheim, Berlin Centre for Consumer Policies, Asia-Pacific Innovation Conference APIC (Beijing). Gakushuin University. University of Vienna (invited).
- ◇ **2018:**  
National Bureau of Economic Research NBER (Cambridge, MA), 11<sup>th</sup> Annual Conference on Innovation Economics, accepted (Northwestern, Chicago), Academy of Management Meeting, accepted (Chicago), Copenhagen Business School, VHB TIE Tagung (Hamburg).
- ◇ **2017:**  
Academy of Management Meeting 2017 (Atlanta), 5<sup>th</sup> Collquium on Digital Transformation (Cologne), Asia-Pacific Innovation Conference APIC (Fukuoka), 7th ZEW/-MaCCI Conference (Mannheim).
- ◇ **2016:**  
DRUID Asia 2016, Patents 2016 (Munich), Max-Planck-Institute Munich.
- ◇ **2015:**  
University of Lugano (invited), Academy of Management Meeting 2015 (Vancouver), University of Darmstadt (invited)

- ◇ **2014:**  
Copenhagen Conference on Innovation and Entrepreneurship 2014, DRUID 2014 (Copenhagen), Academy of Management Meeting 2014 (Philadelphia), Universidad Carlos III at Madrid (invited)
- ◇ **2013:**  
ARISE Workshop at National University of Singapore NUS, INNOPAT (ZEW Mannheim), TIGER (Toulouse), University of Trier, EPIP conference (Paris), VHB TIE Tagung (Sankt Gallen)
- ◇ **2012:**  
UNO-MERIT/School of Governance Seminars (Maastricht), Conference on Patents, Entrepreneurship and Innovation (Alexandria, VA), Institute for Empirical Research in Economics (Leipzig), Academy of Management Meeting (Boston, MA), Yonsei University, School of Business (Seoul), Third Asia-Pacific Innovation Conference (Seoul)

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- TEACHING EXPERIENCE
- ◇ **Management of Innovation and Technology**
    - Ph.D. level, core course, Berlin Doctoral Program in Economics and Management Science BDPEMS (since 2012).
    - MBA/Executive MBA, core/elective courses, ESMT (since 2011); Yonsei University, School of Business (2012); Pontificia Universidad Catolica de Chile (2019, 2018, 2017)
    - Master of Science in Management, core/elective course, ESMT (since 2015 – Award for excellence in teaching and inclusion in the President’s Honor Roll for Teaching Excellence), LMU Munich (2009); EPFL Lausanne (2013).
    - Bachelor in Management, core course, University of Bayreuth (2010), LMU Munich (2010, 2009, 2008).
  - ◇ **Entrepreneurship/Business Planning**
    - MBA, core course, ESMT (since 2011 – Award for excellence in teaching and inclusion in the President’s Honor Roll for Teaching Excellence).
    - European Master in Management, core course , EM Lyon (2010, 2009, 2008).
    - Bachelor in Management, LMU Munich (2006).
  - ◇ **Quantitative methods/econometrics**
    - Ph.D. level, LMU Munich (2009, 2008, 2007), German Association of Professors in Management VHB (part of VHB’s ProDok course series; since 2010).
    - Bachelor in Management, core course and various seminars, LMU Munich (2007, 2005, 2004, 2003).

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- 3<sup>rd</sup> PARTY FUNDING
- ◇ **DFG German Science Foundation (2021):**  
Research grant to study R&D competition in the pharmaceutical industry, 136,000 EUR.
  - ◇ **Curtius Foundation (2021):**  
Risk-taking and breakthrough innovation – evidence from the pharmaceutical industry, 15,000 EUR.
  - ◇ **EY Research Grant (2020):**  
Data-driven drug development – How to navigate regulatory challenges, 10,000 EUR.
  - ◇ **DFG German Science Foundation (2018):**  
Conference grant for the 2018 Annual Meeting of the EPIP Association, 30,000 EUR.
  - ◇ **Curtius Foundation (2017):**  
Research grant for evaluating strategies to optimize freemium pricing strategies for online based business models, 15,000 EUR.

- ◇ **COST Grant** (2010):  
COST/STRIKE grant for a research visit at University of Camerino, Italy, 5,000 EUR.
- ◇ **DAAD Travel Grants** (2018, 2011, 2009, 2008):  
DAAD travel grant for presentation at various locations/conferences.
- ◇ **ENTR/05/82** (2006–2007):  
Research project on "The Strategic Use of Patents and its Implications for Enterprise and Competition Policies" commissioned by the European Commission (Enterprise and Industry Directorate-General), jointly with D. Harhoff, B. Hall, G. von Graevenitz, K. Hoisl, 125,000 EUR.
- ◇ **Collaborative Research Center (SFB) TR15** (2007-2011):  
Member ("Grundausrüstung") of the SFB TR15 "Governance and the Efficiency of Economic Systems" within the project C2 "Intellectual Property, Appropriation of Rents from Innovation, and Competition for Innovation".
- ◇ **Strategies for the Promotion of Regenerative Technologies in Medicine and Biology** (2006):  
Value capture in regenerative technologies in Medicine and Biology for the German Federal Ministry of Education and Research, 16,660 EUR.
- ◇ **Collaborative Research Center (SFB) 386** (2002–2006):  
Member ("Ergänzungsausstattung") of the SFB 386 "Statistical Analyses of Discrete Structures" within the project A8 "Econometric Analysis of Discrete Data in Empirical Industrial Economics".