11th February 2026

Dear Selection Committee,

I am writing to apply for the NBER Innovation Research Boot Camp 2026. I am currently a Postdoctoral Associate with FutureTech at the Massachusetts Institute of Technology, and I defended my PhD at the Universitat Autònoma de Barcelona in June 2025.

As requested, my application package includes my one-page research essay, CV, and PhD courses transcript. Professor Christian Fons-Rosen (University of California, Merced) has kindly agreed to provide a letter of recommendation and has submitted it to the email address indicated in the call for applications.

I can be reached at jemmens@mit.edu and further details on my research profile can be found on my website josephemmens.com.

Thank you for your time and consideration.

Sincerely,
Joseph Alexander Emmens

My research agenda centres on questions around knowledge production as a driver of economic growth. This agenda was established in my PhD dissertation, "Three Essays on Innovation: A Text Analysis Approach." In this thesis, I developed a novel framework that integrates inventor teams with patent text data. I modelled collaboration using a Bayesian natural language processing approach. By combining high-dimensional text data with a statistical model of teamwork, this enabled me to disentangle individual inventors' contributions to a patent's knowledge content and to position inventors and research fields within a common knowledge space. This framework provides a tractable foundation for my broader research agenda on knowledge production.

Building directly on this research, I have developed two working papers to date. The first shows how inventors' contributions to innovation evolve with seniority, while the second examines which teams produce breakthrough innovations and the role of building on prior research. The findings unify key elements of collaboration. Teams build on existing knowledge, and prior work both supports and obstructs innovation. I show that teams create more breakthrough research when building on enough prior work to incorporate valuable knowledge, but not so much as to stifle novelty. This work was recognised as runner-up for the 2025 Best Economics Job Market Paper awarded by the European Economic Association and UniCredit.

My future research will extend the text-based framework developed in my work on inventor teams and integrate it with my research on automation and AI. At MIT FutureTech, I have begun a project to understand the use and impact of AI across scientific and R&D occupations. Central to this work is the construction of the first comprehensive task taxonomy for science and technology. This taxonomy provides fine-grained task bundles for scientific occupations that can then be mapped to measures of AI model capabilities and costs. This framework will enable the study of how progress in AI reshapes the organisation of scientific work and the direction of technological change. In a related project with Christian Fons-Rosen, we are studying the role of public funding in driving the emergence of new technological fields. We are building directly on the knowledge-space framework developed during my PhD. This project contributes by examining when public funding enters a field's lifecycle and any associated effect in driving technological progress. We then examine how this translates into social returns from science and innovation.

I would gain immensely from participating in the Innovation Research Boot Camp. My research engages directly with core questions in the economics of innovation, particularly the organisation of team production and the direction of technological change, drawing extensively on the work of Ben Jones and Chad Jones. The opportunity to discuss these questions with faculty and fellow participants working at the frontier of innovation research would help refine both the empirical foundations and conceptual framing of my agenda. Given my research on R&D funding and the emergence of new technological fields, I am also particularly interested in the program's panel featuring Matt Clancy and Dylan Matthews from Coefficient Giving.

I believe that in developing this research agenda I am a strong fit for the Innovation Boot Camp. Participating in the job market last year helped me find my place in the Economics of Innovation research community, and further engagement with this community would materially strengthen both the quality and direction of my work.

PhD Completed Courses

The following courses were completed as part of the PhD in Economic Analysis at the Universitat Autònoma de Barcelona.

Academic Year 2019-2020

Optimization – Prof. C. Papioti

Probability and Statistics – Prof. J. Caballe

Microeconomics I – Prof. X. Vila

Macroeconomics I – Prof. C. Busch

Microeconomics II – Prof. R. Caminal

Macroeconomics II – Prof. A. Ludwig

Macroeconomics III – Prof. F. Obiols

Econometrics I – Prof. P. Milan

Econometrics II – Prof. A. Gröger

Game Theory – Prof. J. Massó

Academic Year 2020-2021

Corporate Finance – Prof. D. Pérez

Applied Public Economics – Prof. H. Mueller and Prof. A. Ferrer

Microeconometrics – Prof. H. Wang

Quantitative Macroeconomics – Prof. R. Santaeulalia

Networks – Prof. P. Milan

Structural Empirical Methods for Labour Economics and Industrial Organization – Prof. J. Llull

Economics of Identity, Culture and Institutions – Prof. E. Hauk

Master's Thesis

"Skill Composition in R&D Teams" – Supervisor: Prof. Hannes Mueller

JOSEPH ALEXANDER EMMENS

jemmens@mit.edu
josephemmens.com

CURRENT ACADEMIC APPOINTMENTS

Massachusetts Institute of Technology **Cambridge, MA, July 2025-Present**
Postdoctoral Associate
Initiative on the Digital Economy (IDE)
Sloan School of Management
Computer Science & Artificial Intelligence Laboratory (CSAIL)

OTHER ACADEMIC AFFILIATIONS

Research Affiliate, Rockwool Foundation Berlin **2025-Present**

EDUCATION

Universidad Autónoma de Barcelona **Barcelona, Spain, Sept 2021-June 2025**
Ph.D., Economic Analysis – *awarded Cum Laude*
Supervisor: Hannes Mueller
Committee (Sam Arts, Fabian Gaessler,
Neus Palomeras, and Olav Sorenson)

University of California, Merced **Merced, CA, Spring Term 2024**
Visiting Ph.D Student
Hosted by Christian Fons-Rosen

Universidad Autónoma de Barcelona **Barcelona, Spain, Sept 2019-June 2021**
Master's in Economic Analysis

Berlin School of Economics and Law **Berlin, Germany, Sept 2014-June 2015**
ERASMUS+ Program

University of the West of England, Bristol **Bristol, UK, Sept 2012-June 2016**
B.A. Hons in Economics with Distinction

RESEARCH INTERESTS

I. Topics: Applied Microeconomics; Economics of Science & Innovation; AI & Automation

II. Methodologies: Causal Inference; Text Analysis; Machine Learning; Microeconomic Theory

WORKING PAPERS

I. From Shares to Machines: How Common Ownership Drives Automation (2024) joint with Dennis C. Hutschenreiter, Felix Noth, Stefano Manfredonia and Tommaso Santini. *IWH-Discussion Paper 23/2024*.

II. Teams and Text: Collaborative Innovation in the Knowledge Space (2025)

WORK IN PROGRESS

I. The Division of Knowledge in Inventor Teams (2025)

II. Acquiring Talent: Using M&As to Redirect Technological Change (2025)

SEMINARS AND CONFERENCES

*Including scheduled**

AY 25/26: *Seminars:* NBER Productivity Lunch*, TPRI's Research Workshop Series Boston University*, Harvard Economics of Science and Engineering; Dauphine PSL.
Conferences: European Economic Association Congress 2025; ASSA Meetings Philadelphia

AY 24/25: *Seminars:* MIT FutureTech; VATT Institute for Economic Research; CUNEF University; Bank of Spain; Central European University; University of Tübingen; Max Planck Institute for Innovation and Competition; Tilburg University Macro Club
Conferences: Institutional and Organizational Economics Academy (IOEA); European Association for Young Economists (EAYE); Research Infrastructure for Science and Innovation Policy Studies (RISIS).

AY 23/24: *Seminars:* Barcelona Supercomputer Center; Universidad Autónoma de Barcelona Applied Group.
Conferences: Spanish Economic Association Symposium; Workshop on Entrepreneurial Finance and Innovation (WEFI); Barcelona School of Economics Summer Forum; Spanish Finance Association Forum; Université libre de Bruxelles ENTER Jamboree; Entrepreneurship and Innovation Workshop UC Berkeley.

AY 22/23: *Seminars:* Universidad Autónoma de Barcelona Applied Group; Universidad Autónoma de Barcelona MicroLab.
Conferences: University of Mannheim ENTER Jamboree; Barcelona School of Economics Jamboree.

AWARDS, GRANTS AND HONOURS

1. Best Job Market Paper *Runner-up* – European Economic Association and UniCredit (2024)
2. PhD Mentoring Day Best Contributions – Spanish Finance Association Forum, Tenerife (2024)
3. FPI Scholarship – Spanish Ministry of Science and Innovation Grant: PID2020-114251GB-I00
4. Severo Ochoa – Barcelona School of Economics

GRADUATE TEACHING EXPERIENCE

Instructor Intensive Courses	**Rating (Out of 5)**
Stata for Empirical Finance – ESADE, Spring 2023, Spring 2024	4.9, 4.64
Data Analysis in Stata – UAB IDEA, Fall 2022	4.8
Teaching Assistant	
Information Economics, Prof. Inés Macho Stadler – UAB IDEA, Fall 2023	4.9
Corporate Finance, Prof. David Pérez-Castrillo – UAB IDEA, Fall 2023	4.9
Spatial Economics, Prof. André Groeger – UAB IDEA, Spring 2023	4.8
Quantitative and Statistical Methods II, Prof. Joan Llull – BSE, Spring 2022, Spring 2023	4.8, 4.4

OTHER DETAILS

Academic Positions	
Assistant Data Editor: The Econometric Society	July 2023 - Apr 2025
Assistant Data Editor: The Royal Economic Society	Mar 2022 - Oct 2023
Assistant to the Editor: BSE Focus	Feb 2021 - Sept 2021
Research Assistant	
Prof. Jordi Brandts – IAE CSIC	Spring 2025
Prof. Alexander Krauss – IAE CSIC	Spring 2025
Prof. Anastassia Obydenkova – IAE CSIC	Spring 2025

Prof. Laura Mayoral – IAE CSIC	Spring 2024
Prof. Matthew Ellman – IAE CSIC	Spring 2024
Prof. Vicente Bermejo – ESADE	Summer 2022
Prof. Hanna Wang – UAB IDEA	Summer 2021

Academic Service

Organiser of the MIT FutureTech Economics of AI and Automation Workshop	2025

Previous Non-Academic Employment

Number 16 English Academy, ESL Teacher	2017-2019
Brandon Trust, Operational Support Worker	2016-2017

Programming

Python (Advanced), Stata (Advanced), R (Intermediate), Matlab (Intermediate)

Languages

English (Native), Spanish (Fluent)

Last Updated: January, 2026

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UNIVERSITY OF CALIFORNIA MERCED
5200 N. LAKE ROAD | MERCED, CA 95343
TEL: 209.228.4400

February 10th, 2026

Christian Fons-Rosen
Associate Professor
Department of Economics
University of California – Merced
cfons-rosen@ucmerced.edu

To Whom It May Concern:

This is a letter in support of Joe Emmens to participate in the *NBER Innovation Research Boot Camp 2026*. Joe is currently a post-doc at MIT's Computer Science and Artificial Intelligence Lab after going to the job market with a paper that analyzes the role of team composition in advancing the innovation frontier. While an effective organization of teams seems like a first-order thing to know for policymakers, its production process is nonetheless not yet well understood. Joe's is the first paper to carefully infer at a large scale the contribution share of each inventor to a given group project, in this case, exemplified by the patent. The paper opens the door to a set of future papers that helps us better understand the dynamics of team work.

I have known Joe for three years. Joe's PhD Advisor (Hannes Mueller, IAE-CSIC, Barcelona) put us in contact given our overlap in research interests in natural language processing (NLP) and innovation. It became clear from the beginning that Joe is a mature scholar who knows well how to do frontier research. Since our initial conversations I have seen Joe as a fellow researcher who systematically contributes great insights to our joint brainstorm sessions. While the initial goal was for me to provide advice on Joe's job market paper, our shared interests and good personal connection quickly took us to discuss ideas to develop together.

Joe is an independent thinker who pursues his own research agenda and is capable of performing at a very high level in the tasks that a polished paper requires. He comes up with novel research ideas and, at the same time, is also proficient in coding algorithms in Python that are pivotal for his job market paper. Furthermore, he has great social skills that allow him to present complex ideas in intuitive terms. Overall, I think Joe is the complete package and he is at an ideal stage of his career to attend the bootcamp.

Yours sincerely,

Christian Fons-Rosen