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## **Alexander Michael Petersen**

Associate Professor — University of California, Merced

[Department of Management of Complex Systems](#)

[Ernest and Julio Gallo Management Program](#) | School of Engineering

Associate Professor (with tenure), University of California, Merced

July 2021-present

Assistant Professor (TT), University of California, Merced

July 2016-June 2021

Assistant Professor (TT), IMT Lucca School for Advanced Studies, Lucca Tuscany, Italy

June 2011-June 2016

## **EDUCATION, RESEARCH, TEACHING, SERVICE, OTHER**

**Heritage:** Naturalized U.S. Citizen, Hispanic (Born: Bogota, Colombia, 1981)

**Languages:** English (first), Spanish (advanced experience 4/5 - conversational), Italian (medium experience 2/5)

### **Education:**

- Ph.D. Physics (Boston University, March 2011). Advisor: H. Eugene Stanley. Thesis: [Applications of Statistical Physics to the Social and Economic Sciences](#).
- B.Sc. Mathematics, Applied Physics (Double major; University of Utah, May 2003)

**Research:** Analysis of socio-economic systems using concepts and methods from complex systems, statistical physics, and management and innovation science.

**Computing:** C++, Mathematica, Python, STATA, Gephi, UNIX, LaTeX, HTML/CSS.

### **Teaching:**

- UC Merced: MIST 203 *Quantitative Tools for Management* (Grad. MM program); MIST 134 *Methods of Data & Network Science* (UG); MIST 135 *Technical Communication and Visualization Skills* (UG); SPARK: *Science of Science* (UG); DSA 001/MIST 060 *Introductory Data Analytics* (UG); MIST 270 *Data Science* (G); DSA 002 *Thinking like a programmer* (UG).

**Visiting Researcher:** Dept. of Economics, Pontificia Universidad Javeriana, Bogota Colombia (Oct.-Dec. 2015)

### **University Service:**

- UCM School of Engineering, Faculty Executive Committee. Chair (AY 23-24); member (AY 19-20)
- Management of Complex Systems Department, School of Eng., UCM — founding faculty member (2016-pres.)
- UCM E&J Gallo School of Management (proposed): Executive Planning Committee member (Fall 2021-2023)
- Educational program development: (Undergraduate) Data Science & Analytics, B.A. (lead); Technology Management, B.A. (lead); (Graduate) Masters in Data Science and Analytics (member, pending approval).
- [National Parks Institute](#). Member and participant in 2017 launch (2017 - present.)
- [HackMerced](#) student group faculty advisor (2019-2024)

## **GRADUATE STUDENT & POST-DOCTORAL RESEARCHERS**

- Andrea del Pilar Montaña Ramirez: MCS PhD student, 2022-pres. (principal advisor)
- Dr. Felber Arroyave Bermudez, UC Merced (PhD 2023, Environmental Systems, Dissertation co-advisor)
- Dr. Dong Yang, UC Merced (Postdoctoral Scholar, 1/2020-6/2021)
- Dr. Omar A. Doria Arrieta, IMT Lucca, Economics, Markets, Institutions (PhD 2017, Dissertation co-advisor)
- Dr. Paulo Sgrignoli, IMT Lucca, Economics, Markets, Institutions (PhD 2014, Dissertation co-advisor)

## **GRANTS & AWARDS**

- Co-PI: *Senate Faculty Research Award*. \$40,000 (total) UC Merced  
2017 w/ L. Westerling; 2022 w/ J. Jenkins; 2024 w/ T. Lempiala, 2024.
- Co-PI: [EAGER From Genomics to Brain Sciences: What Makes Researchers Tick in Transdisciplinary Initiatives](#).  
One-year EAGER grant, #1738163, 2017-2018, \$60,408, with Prof. Pavlidis (U. Houston); funded by the Science of Science & Innovation Policy (SciSIP) program, **National Science Foundation**
- 2019 UC Merced Hellman Faculty Fellows Award. \$25,000. **Hellman Faculty Fellows Fund**

## Peer-Reviewed Publications – by Journal, Impact, Role, and Career Period

JOURNAL TYPE	JOURNAL (IMPACT FACTOR)	PUBS.	AS 1ST / CORR. AUTHOR	PUBS. SINCE PHD (2012-)	AS 1ST / CORR. AUTHOR (2012-)	PUBS. SINCE UCM (2016-)	AS 1ST / CORR. AUTHOR (2016-)
<b>Multi-Disc/ Hi-Impact</b>	Science (48), Nat. Comm. (15), Science Advances (14), Proc. Nat. Acad. Sci./PNAS (11)	11	7	8	6	4	3
<b>Management /Economics</b>	Research Policy (8), Nature Humanities & Social Sciences Comm. (3.5), Research Evaluation (3.3), Applied Econ. Lett. (1.6), J. Env. Mgmt. (8.7)	7	6	7	6	5	5
<b>Multi-D/Other</b>	Scientific Reports (4.4), Journal of the Royal Society Interface (4.1), Advances in Complex Systems (1.2), Applied Network Science (2.7)	10	10	9	9	6	6
<b>Information Science</b>	J.Informetrics (5.1), EPJ Data Science (3.2), Frontiers in Research Metrics & Analytics (NA)	6	4	6	4	3	2
<b>Physics</b>	Nature Physics (20), Chaos Solitons & Fractals (5.9), Physics Today (4), Phys. Rev. E (2.5), J. Stat. Mech (2.2), Europhysics Letters (1.9), EPJ B (1.5)	12	7	3	1	1	1
<b>Other</b>	Sci. & Eng. Ethics (3.5), Social Science Information (0.7), American Scientist (0.7), Annals Amer. Assoc. Geographers (2.8)	4	1	4	1	3	0
<b>Total</b>	24 journals	50	35	37	27	22	17

### PUBLICATIONS

1. A. M. Petersen, F. Arroyave, F. Pammolli. [\*The disruption index suffers from citation inflation and is confounded by shifts in scholarly citation practice\*](#). Under review (2023).
2. A. M. Petersen, F. Arroyave, F. Pammolli. [\*The disruption index is biased by citation inflation\*](#). Under review (2023).
3. A. M. Petersen. [\*Shift in house price estimates during COVID-19 reveals effect of crisis on collective speculation\*](#). Under review (2023).
4. A. M. Petersen. [\*How Much Did Pandemic Uncertainty Affect Real-Estate Speculation? Evidence from On-Market Valuation of For-Sale Versus Rental Properties\*](#). Applied Economics Letters (2024).
5. F. Arroyave, J. Jenkins, S. Shackelton, B. Jackson, A. M. Petersen. [\*Research alignment in the U.S. National Park System: Impact of transformative science policy on the supply and demand for scientific knowledge for protected area management\*](#). J. Environmental Management 357, 120699 (2024).
6. F. Arroyave, J. Jenkins, A. M. Petersen. [\*Network embedding for understanding the National Park System through the lenses of news media, scientific communication and biogeography\*](#). Annals of the American Association of Geographers (2023).
7. A. M. Petersen, F. Arroyave, I. Pavlidis. [\*Methods for measuring social and conceptual dimensions of Convergence Science\*](#). Research Evaluation 32(2), 256-272 (2023).
8. D. Yang, I. Pavlidis, A. M. Petersen. [\*Biomedical convergence facilitated by the emergence of technological and informatic capabilities\*](#). Advances in Complex Systems 25, 2350003 (2023).
9. I. Pavlidis, E. Akleman, A. M. Petersen. [\*From Polymaths to Cyborgs – Convergence Is Relentless\*](#). American Scientist 110 (July/August issue), 196-200 (2022)
10. A. M. Petersen. [\*Evolution of biomedical innovation quantified via billions of distinct article-level MeSH keyword combinations\*](#). Advances in Complex Systems 24, 2150016 (2022).
11. F. Arroyave, O. Y. Romero Goyeneche, M. Gore, G. Heimeriks, J. Jenkins, A. M. Petersen. [\*On the social and cognitive dimensions of wicked environmental problems characterized by conceptual and solution uncertainty\*](#). Advances in Complex Systems 24, 215005 (2021).
12. A. M. Petersen, M. Ahmed, I. Pavlidis. [\*Grand Challenges and Emergent Modes of Convergence Science\*](#). Nature Humanities and Social Sciences Communications 8, 194 (2021).

13. F. J. Arroyave, A. M. Petersen, J. Jenkins, R. G. Hurtado. [Multiplex networks reveal geographic constraints on illicit wildlife trafficking](#). *Applied Network Science* **5**, 20 (2020).
14. A. M. Petersen, O. Penner. [Renormalizing individual performance metrics for cultural heritage management of sports records](#). *Chaos, Solitons & Fractals* **136**, 109821 (2020).
15. D. Majeti, E. Akleman, M. E. Ahmed, A. M. Petersen, B. Uzzi, I. Pavlidis. [Scholar Plot: Design and Evaluation of an Information Interface for Faculty Research Performance](#). *Front. in Research Metr. and Anal.* **4**, 6 (2020).
16. A. M. Petersen. [Megajournal mismanagement: Manuscript decision bias and anomalous editor activity at PLOS ONE](#). *Journal of Informetrics* **24**, 200974 (2019).
17. A. M. Petersen, R. K. Pan, F. Pammolli, S. Fortunato. [Methods to account for citation inflation in research evaluation](#). *Research Policy* **48**, 1855-1865 (2019).
18. A. M. Petersen, E. Vincent, A. L. Westerling. [Discrepancy in scientific authority and media visibility of climate change scientists and contrarians](#). *Nature Communications* **10**, 3502 (2019). *Article Addendum*.
19. A. M. Petersen. [Multiscale impact of researcher mobility](#). *J. Royal Society Interface* **15**, 20180580 (2018).
20. A. M. Petersen, D. Majeti, K. Kwon, M. Ahmed, I. Pavlidis. [Cross-disciplinary evolution of the genomics revolution](#). *Science Advances* **3**, eaat4211 (2018).
21. R. K. Pan, A. M. Petersen, F. Pammolli, S. Fortunato. [The Memory of Science: Inflation, Myopia, and the Knowledge Network](#). *J. Informetrics* **12**, 656-678 (2018).
22. S. Fortunato, C. T. Bergsrom, K. Borner, J. A. Evans, D. Helbing, S. Milojevic, A. M. Petersen, F. Radicchi, R. Sinatra, B. Uzzi, A. Vespignani, L. Waltman, D. Wang., A.-L. Barabasi. [Science of Science](#). *Science* **359**, eaao0185 (2018).
23. A. M. Petersen, M. Puliga. [High-skilled labor mobility in Europe before and after the 2004 enlargement](#). *Journal of the Royal Society Interface* **14**, 20170030 (2017). [[Cover image](#)]
24. O. Doria Arrieta, F. Pammolli, A. M. Petersen. [Quantifying the negative impact of brain-drain on the integration of European science](#). *Science Advances* **3**, e1602232 (2017).
25. L. Leydesdorff, A. M. Petersen, I. Ivanova. [Self-organization of meaning and the reflexive communication of information](#). *Social Science Information*, **56**(1), 4-27 (2017).
26. A. M. Petersen, D. Rotolo, L. Leydesdorff. [A Triple Helix Model of Medical Innovation: Supply, Demand, and Technological Capabilities in terms of Medical Subject Headings](#). *Research Policy* **45**(3), 666-681 (2016).
27. A. M. Petersen. [Quantifying the impact of weak, strong, and super ties in scientific careers](#). *Proceedings of the National Academy of Sciences USA* **112**, E4671-E4680 (2015).
28. A. Morescalchi, F. Pammolli, O. Penner, A. M. Petersen, M. Riccaboni. [The evolution of networks of innovators within and accross borders: Evidence from patent data](#). *Research Policy* **44**(3), 651-668 (2015).
29. A. M. Petersen, O. Penner. [Inequality and cumulative advantage in science careers: a case study of high-impact journals](#). *EPJ Data Science* **3**, 24 (2014).
30. I. Pavlidis, A. M. Petersen, I. Semendeferi. [Together we stand](#). *Nature Physics* **10**, 700-702 (2014).
31. C. Schulz, A. Mazloumian, A. M. Petersen, O. Penner, D. Helbing. [Exploiting citation networks for large-scale name disambiguation](#). *EPJ Data Science* **3**, 11 (2014).
32. A. M. Petersen, S. Fortunato, R. K. Pan, K. Kaski, O. Penner, A. Rungi, M. Riccaboni, H. E. Stanley, F. Pammolli. [Reputation and impact in academic careers](#). *Proceedings of the National Academy of Sciences USA* **111**, 15316-15321(2014).
33. A. M. Petersen, I. Pavlidis, I. Semendeferi. [A quantitative perspective on ethics in large team science](#). *Sci. & Eng. Ethics* **20**, 923-945 (2014).
34. O. Penner, R. K. Pan, A. M. Petersen, K. Kaski, S. Fortunato. [On the predictability of future impact in science](#). *Scientific Reports* **3**, 3052 (2013).
35. A. M. Petersen, S. Succi. [The Z-index: A geometric representation of productivity and impact which accounts for information in the entire rank-citation profile](#). *J. Informetrics* **7**, 823-832 (2013).
36. O. Penner, A. M. Petersen, R. K. Pan, S. Fortunato. [The case for caution in predicting scientists' future impact](#). *Physics Today* **66**, 8 (2013).

37. A. Chessa, A. Morescalchi, F. Pammolli, O. Penner, A. M. Petersen, M. Riccaboni. [Is Europe evolving toward an integrated research area?](#) *Science* **339**, 650 (2013).
38. A. M. Petersen, J. Tenenbaum, S. Havlin, H. E. Stanley, M. Perc. [Languages cool as they expand: Allometric scaling and the decreasing need for new words.](#) *Scientific Reports* **2**, 943 (2012).
39. A. M. Petersen, M. Riccaboni, H. E. Stanley, F. Pammolli. [Persistence and Uncertainty in the Academic Career.](#) *Proceedings of the National Academy of Sciences USA* **109**, 5213 (2012).
40. A. M. Petersen, J. Tenenbaum, S. Havlin, H. E. Stanley. [Statistical Laws Governing Fluctuations in Word Use from Word Birth to Word Death.](#) *Scientific Reports* **2**, 313 (2012).
41. A. M. Petersen, H. E. Stanley, S. Succi. [Statistical regularities in the rank-citation profile of scientists.](#) *Scientific Reports* **1**, 181 (2011).
42. A. M. Petersen, W-S. Jung, J-S. Yang, H. E. Stanley. [Quantitative and Empirical demonstration of the Matthew Effect in a study of Career Longevity.](#) *Proceedings of the National Academy of Sciences USA* **108**, 18 (2011).
43. A. M. Petersen, O. Penner, H. E. Stanley. [Methods for detrending success metrics to account for inflationary and deflationary factors.](#) *Eur. Phys. J. B.* **79**, 67 (2011). Preprint title: [Detrending career statistics in professional baseball: Accounting for the Steroids Era and beyond.](#)
44. B. Podobnik, D. Horvatic, A. M. Petersen, B. Urošević, H. E. Stanley. [Bankruptcy Risk Model and Empirical Tests.](#) *Proceedings of the National Academy of Sciences USA* **107**, 18325 (2010).
45. A. M. Petersen, F. Wang, S. Havlin, H. E. Stanley. [Market dynamics immediately before and after financial shocks: Quantifying the Omori, productivity and Bath laws.](#) *Phys. Rev. E* **82**, 036114 (2010).
46. B. Podobnik, D. Horvatic, A. M. Petersen, M. Njavro, H. E. Stanley. [Common scaling behavior in finance and macroeconomics.](#) *Eur. Phys. J. B* **76**, 487 (2010).
47. A. M. Petersen, B. Podobnik, D. Horvatic, H. E. Stanley. [Scale-invariant properties of public-debt growth.](#) *Europhysics Letters* **90**, 38006 (2010).
48. A. M. Petersen, F. Wang, H. E. Stanley. [Methods for measuring the citations and productivity of scientists across time and discipline.](#) *Physical Review E* **81**, 036114 (2010).
49. A. M. Petersen, F. Wang, S. Havlin, H. E. Stanley. [Quantitative law describing market dynamics before and after interest-rate change.](#) *Physical Review E* **81**, 066121 (2010).
50. B. Podobnik, D. Horvatic, A. M. Petersen, H. E. Stanley. [Cross-Correlations between Volume Change and Price Change.](#) *Proceedings of the National Academy of Sciences USA* **106**, 22079 (2009).
51. B. Podobnik, D. Horvatic, A. M. Petersen, H. E. Stanley. [Quantitative relations between risk, return and firm size.](#) *Europhysics Letters* **85**, 50003 (2009).
52. A. M. Petersen, W-S. Jung, H. E. Stanley. [On the distribution of career longevity and the evolution of home run prowess in professional baseball.](#) *Europhysics Letters* **83**, 50010 (2008).
53. M. Mabilia, A. Petersen, S. Redner. [On the Role of Zealotry in the Voter Model.](#) *J. Stat. Mech.* **08**, P08029 (2007).

## EDITORIAL SERVICE

Associate Editor, *Advances in Complex Systems* (Wiley publishing). 2019-present.

Associate Editor, *PLOS Complex Systems* (Public Library of Science). 2023-present.

## REFEREE SERVICE

Science, Science Advances, Nature, Nature Physics, Nature Human Behaviour, Nature Communications, Proceedings of the National Academy of Sciences USA, Research Policy, Physical Review Letters, Journal of the Royal Society Interface, J. Informetrics, Service Science, National Science Foundation (NSF) proposal review, EU COST open call transdomain proposal on “big data”, Austrian Science Fund (FWF) research project grant proposal review, Europhysics Letters (named a [2011 distinguished referee](#)), Physica A (named a 2013 distinguished referee), Journal of Statistical Mechanics, PLOS ONE, Scientific Reports, Journal of the American Society for Information Science and Technology (JASIST), European Physics J. B (EPJB), European Physics J. Data Science (EPJDS), Royal Society Open Science, Knowledge and Information Systems, European Sociological Review, Industry & Innovation,

“Chaos, Solitons, and Fractals”, Scientometrics, International Journal of Climatology, BMC Biology, Bioscience, Big Data & Society, Technology in Society.

### SELECT MEDIA COVERAGE

- [Media creates false balance on climate science, study shows](#), University of California Media Feature
- [Go figure: salary drives researchers to move to new countries](#), Nature
- [What science can tell us about building great teams](#), Emily Stone - Kellogg School of Management
- [How open access extends the conversation around climate change in the era of fake news](#), Springer Nature
- Altmetric Score = 2058 for article *Discrepancy in scientific authority and media visibility of climate change scientists and contrarians*. (As of 2/2020 this corresponds to rank #821 out of 14+ million outputs tracked by Altmetric)
- [U.S. Media gives too much air time to climate change deniers who don't know what they're talking about](#), Newsweek
- [Personal biases speed up research publication: Megajournal editors under the microscope](#), Nature Index
- [Editors secured citation bump](#), Science
- [Analysis of highly prolific PLOS One editors finds evidence for 'editor-author backscratching'](#), Times Higher Education
- [The growth of papers is crowding out old classics](#), Nature Index
- [Why you should move country](#), Nature
- [Considering going abroad for work?](#), Science
- [Physicists who move abroad can receive a 17% uplift in citations, study reveals](#), Physics World
- [Migration brings citations boost](#), Science
- [Europe's paradox: Why increased scientific mobility has not led to more international collaborations](#), Science
- [Joining the European Union leads to less cross-border collaboration](#), Nature
- [Lifetime collaborators reap the benefits](#), Nature
- [Publishing Partners](#), The Scientist
- [Dynamic duos in science can reap rewards of academic partnerships](#), Times Higher Education
- [Collaboration and scientific career development](#), PNAS Highlight
- [Study suggests long term collaborations result in more productive scientific careers](#), Phys.org
- [Recognition: Build a reputation](#), Nature
- [The benefits of being a big name](#), Nature
- [Researchers say academia can learn from Hollywood](#), Phys.org
- [Scientists' reputations and citation rates](#), PNAS Highlight
- [Researchers prefer citing researchers of good reputation](#), Phys.org
- [Team Science Is Tied to Growth in Grants With Multiple Recipients](#), The Chronicle of Higher Education
- [Family values](#), Chemistry World
- [Choice words: Graphing the evolution of language](#), arts&sciences Fall 2013 Magazine
- [Divinations of academic success may be flawed](#), Nature
- F1000 evaluation of “Statistical laws governing fluctuations in word use from word birth to word death”, Faculty of 1000 post-publication peer review
- [When physicists do linguistics](#), Boston Globe / International Herald Tribune (Feb. 10/11, 2013)
- [Physicists explore the rise and fall of words](#), Inside Science News Service
- [Short-term contracts may hinder young scientists](#), PNAS Highlight
- [The New Science of the Birth and Death of Words](#), Wall Street Journal (Mar. 17, 2012)
- [Languages Lose Vocab to Science and Spell-Check](#), InnovationNewsDaily
- [Digital Spell-Checking May Be Killing Off Words](#), LiveScience / MSNBC / Discovery.com
- [Modern era brings death to words](#), ScienceNews
- [Study reveals words' Darwinian struggle for survival](#), theGuardian
- [Bernanke Announcement Leaves Quake Like Aftershocks](#), Inside Science News Service
- [New Statistical Method Ranks Sports Players From Different Eras](#), MIT Technology Review

- [A Physics Curveball](#), arts&sciences Fall 2010 Magazine (Annual BU Research Highlight)