![Clarivate Web of Science logo]

Workshop on the Implications of Convergence for How the National Center for Science And Engineering Statistics Measures the Science and Engineering Workforce

Day 2 - Measurement efforts
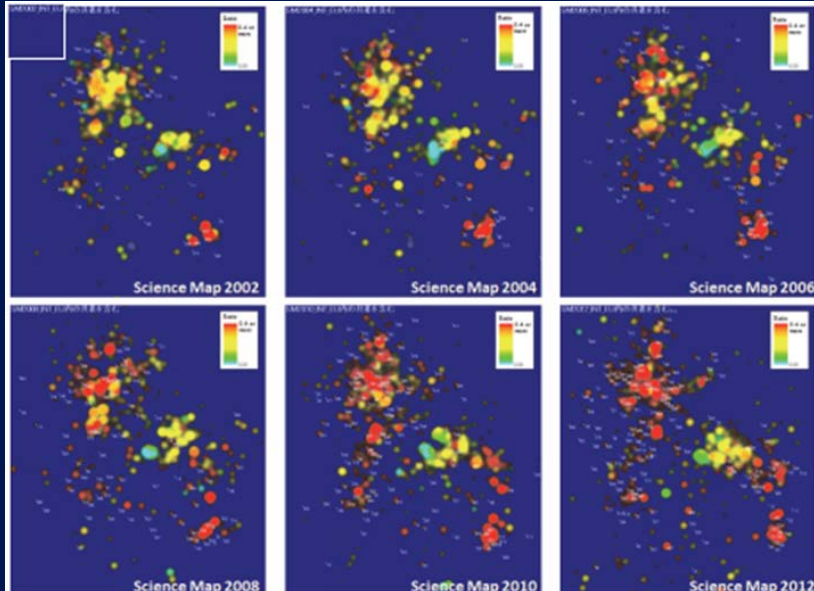
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Measurement Efforts

Broader issues for consideration

Scientometrics (2016) 106:383–403
DOI 10.1007/s11192-015-1648-9

Decreasing diversity in Japanese science, evidence from in-depth analyses of science maps

Masatsura Igami[1] · Ayaka Saka[1]

- Key is determining what NCSES stakeholders want to know about convergence in the national context
  - Theory/conceptualization & science of science
  - Practice of convergence
- Multiple dimensions of convergence should be considered
  - Disciplinary interactions, topics
  - Problem-orientation of the research
  - People, organizations involved
  - Institutional context
  - Tools, equipment, methods involved
  - Learning/educational dimension
  - Infrastructure
- A convergence lens should be applied to existing NCSES data
  - Linked data sets could be particularly important for measuring convergence
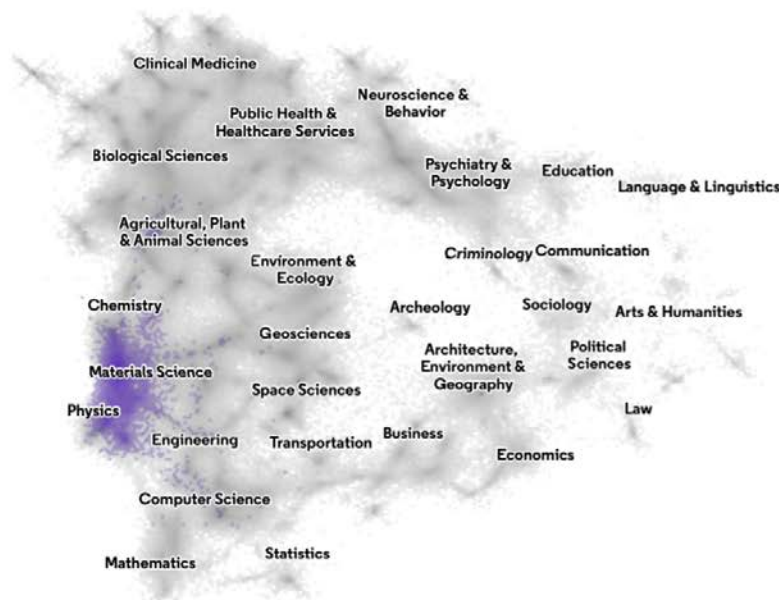
Measurement Efforts
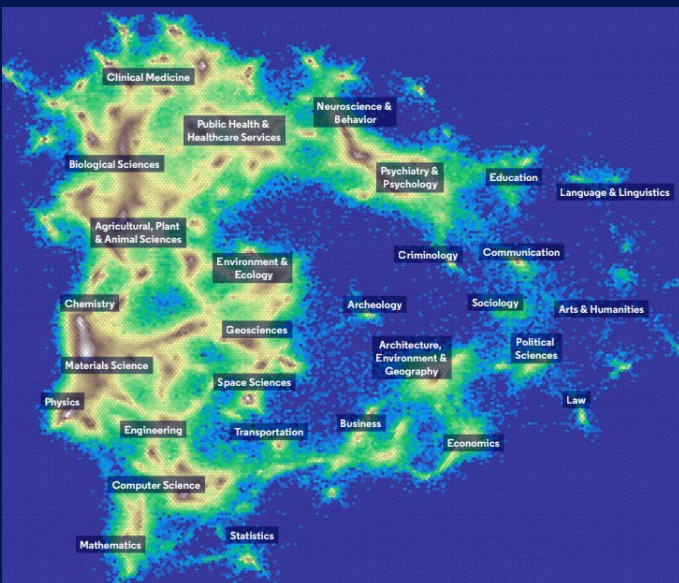
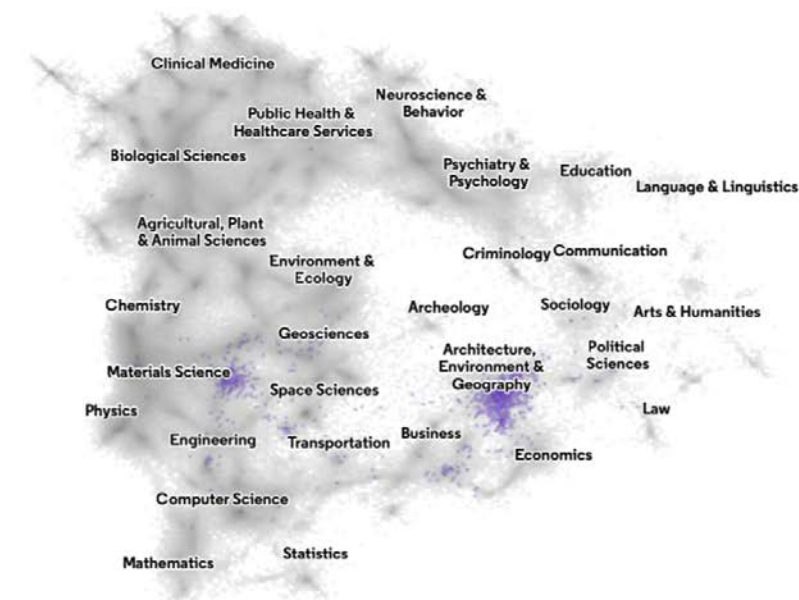Value of bibliometrics in national convergence statistics

All Research Front Articles (2014-2019) plotted using the ISI mapping framework. Altitude corresponds to higher publication concentration.

- Useful, but not perfect
  - Disciplinary interactions & topics
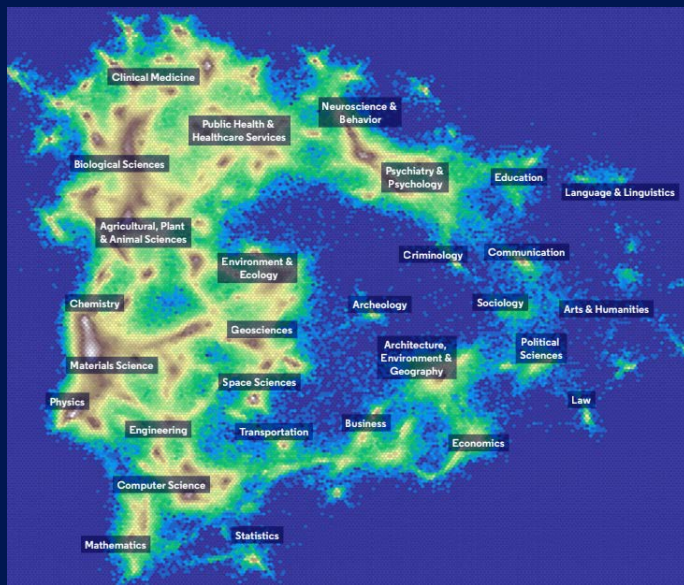

2-D Materials

Global Energy System Transition

Measurement Efforts

Value of bibliometrics in national convergence statistics

All Research Front Articles (2014-2019) plotted using the ISI mapping framework. Altitude corresponds to higher publication concentration.

- Useful, but not perfect
  - Disciplinary interactions & topics
- Somewhat useful, but need refinement/linking to other data
  - People, organizations involved
  - Institutional context
  - Problem-orientation of the research
- Research needed, informed by surveys/data collection
  - Tools, equipment, methods involved
 - Learning/educational dimension

Exploring Convergence Research: An Initial Examination of What It Means and What It Hopes to Accomplish

The purpose of this exploratory research is to understand how "Convergence Research" has been conceptualized and implemented. The goal of the proposed research for EAGER funding is to build on the established literature and leverage existing NSF work to develop a deeper understanding of the conceptual foundations of Convergence Research, how it is practiced and its focus, and lay the groundwork for creating an assessment framework for supporting, documenting and enhancing NSF's programs that invest in the research area.

The proposed research will provide the scaffolding for creating a framework for describing the conceptual underpinnings of Convergence Research and equally important, an understanding of its practice and research products and outcomes. It is especially useful to have a characterization of Convergence that is meaningful at the scale of an individual project.

- Task 1: Literature Review and Bibliometric Landscape Analysis
- Task 2: Interviews with NSF Program Officers and Principal Investigators
- Task 3: Development of a Convergence Research Theory of Change and Logic Model
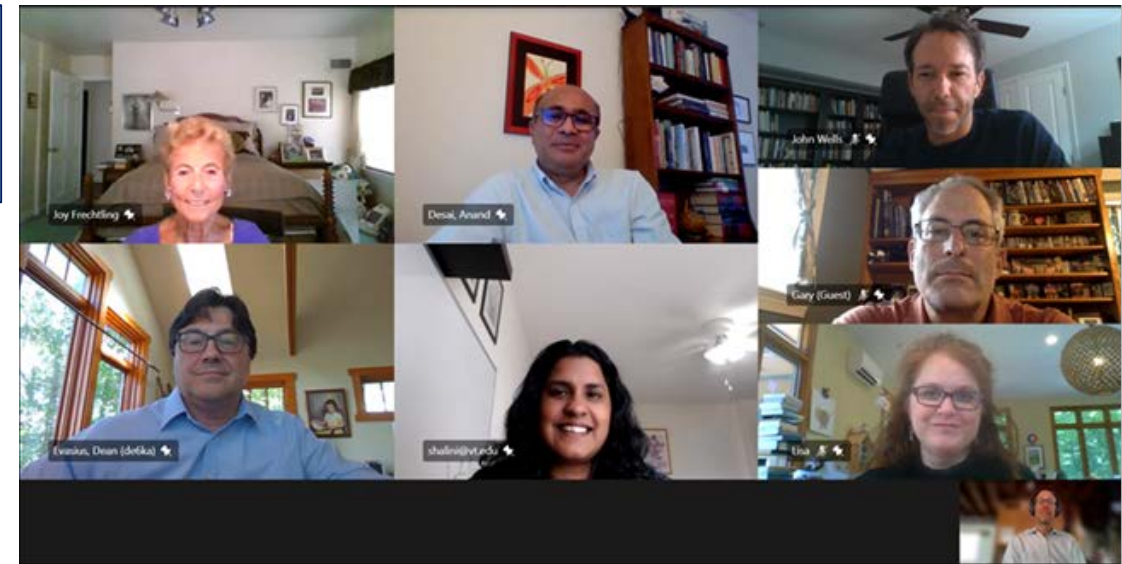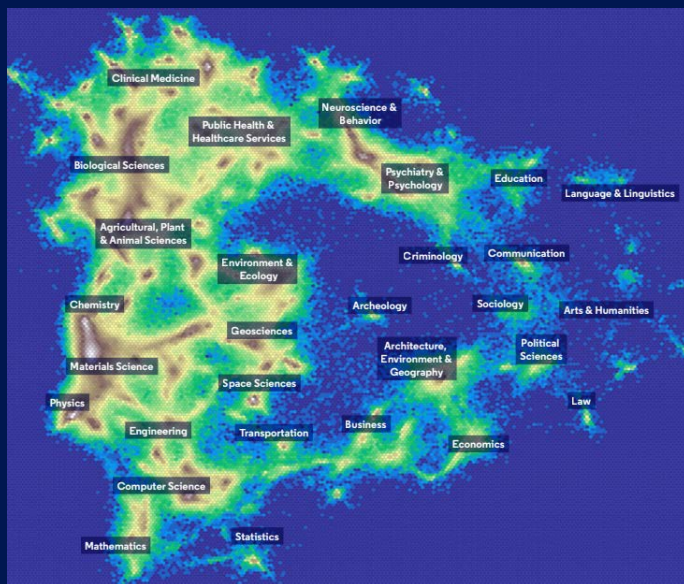
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Measurement Efforts

Final thoughts

All Research Front Articles (2014-2019) plotted using the ISI mapping framework. Altitude corresponds to higher publication concentration.

- Bibliometric analysis is most useful where it can be informed by, and confirmed with, stakeholders (e.g. Japan's NISTEP)

- Topic specific analysis is common, but national level IDR or convergence analysis less so

- Bibliometric data can be further exploited for understanding the theory and practice of convergence

  - citation network graph

  - meaning and use of citations based on citation context

  - text mining (e.g. for tools/methods involved)

  - research and institutional collaboration network graphs