



More of the Same?

The Structure of Research Collaboration Networks in Homogeneous Academic Environments

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Topics on Brazilian Education

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Endogamy, faculty mobility and scientific networks: Impacts on Knowledge Production

- 1 Endogamy in the Brazilian Higher Education System: An In-Depth Analysis**
- 2 Endogamy or Immobility? The Impact on Scholarly Productivity**
- 3 More of the Same? The Structure of Research Collaboration Networks in Homogeneous Academic Environments**

Brief introduction

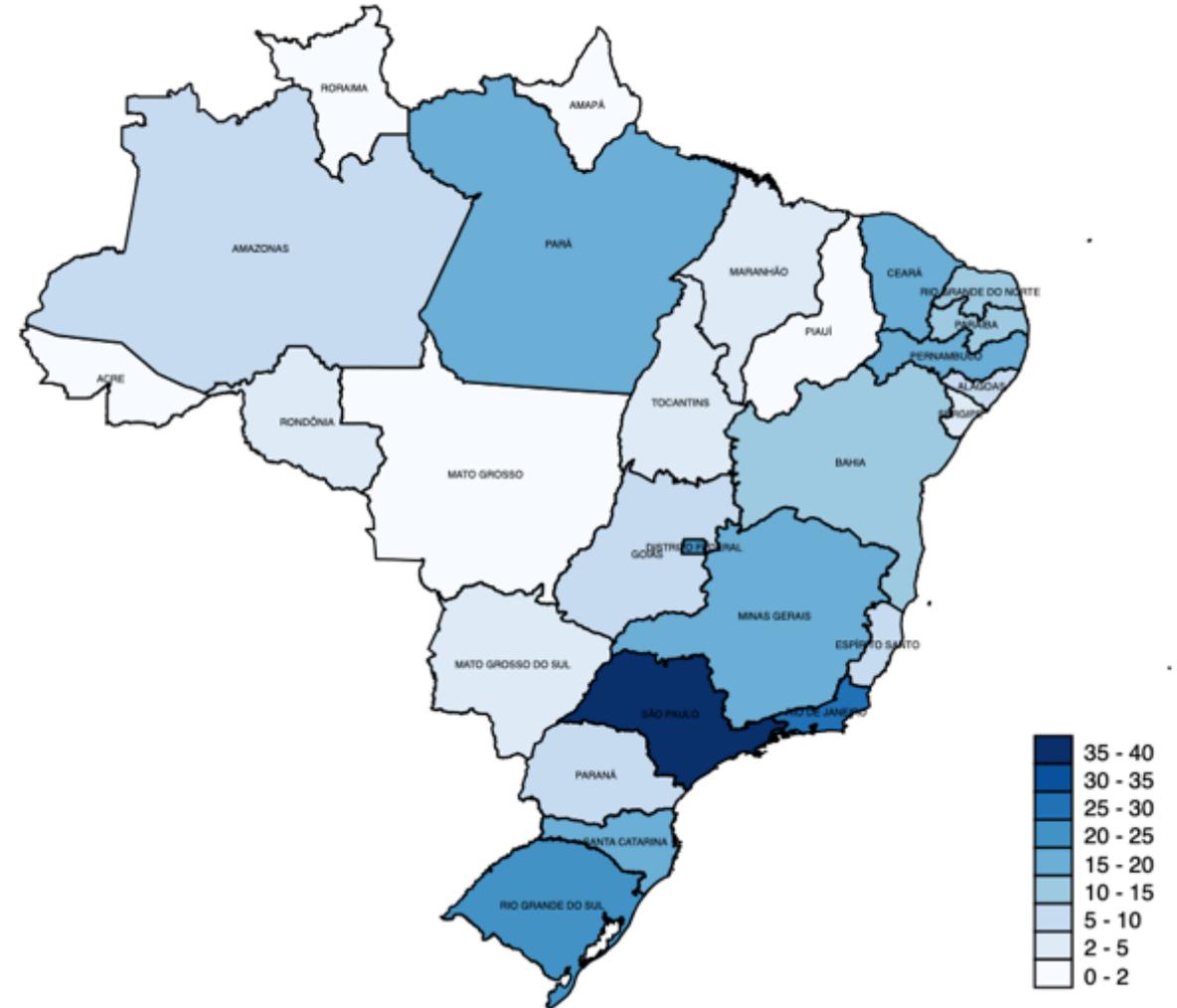
- **Endogamy occurs when universities hire their own alumni as faculty members**
 - Also known as “academic inbreeding”, these terms are heavily biased with negative social preconceptions... (this study suggests identifying these scholars as “**natives**” or “**homegrown**”, instead of “inbreds”)
 - It is perceived as negative in many developed higher education systems (USA, Germany and England). However, it has become part of the local academic culture in many countries, at both mature (Japan, Spain and France) and younger systems (Brazil, Argentina, Eastern European countries).
 - This practice can be due to:
 - **Agency or personal preference;**
 - Nepotism / convenience.
 - **Structural limitations.**
 - Higher education system / job market.

Previous results

First paper identified:

- **23% nationwide;**
- The **rate significantly differs** among distinct **types of institutions, fields of knowledge, states,** and **university ranking** tiers;
- In **elite research universities**, this practice can amount to **up to 70%** of the faculty body;
- Among the **main providers** and **most prestigious consumers** of the well-trained academic workforce.

Native Scholar Rate by Brazilian State
(Year 2016 - Percentage)



Previous results

When **comparing the scientific productivity of native to non-native scholars**, the second paper did not find significant differences among them...

- Outcomes such as:
 - Offering courses;
 - Advising (both undergrad and grad students);
 - Total papers published;
 - Published papers at higher and lower ranked journals;
 - Books;
 - Patents; and
 - Conferences.

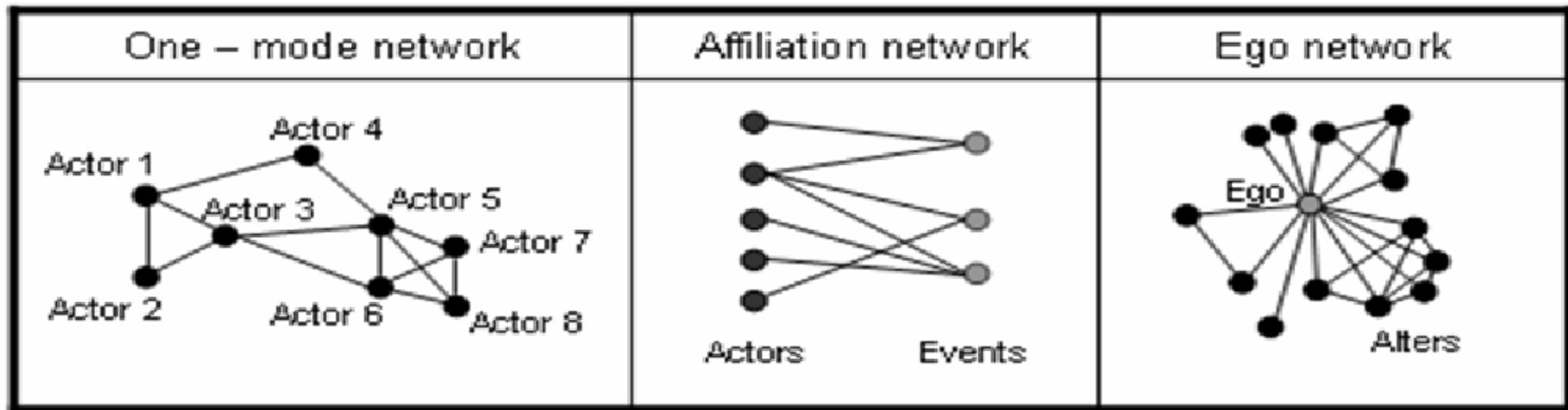
However, when controlling for different types of academic mobility, scholars with some **foreign academic exposure** are **more likely to publish at better ranked journals** and **to advise graduate students, independent** of whether they work at or away from their **alma mater**.

More of the Same?

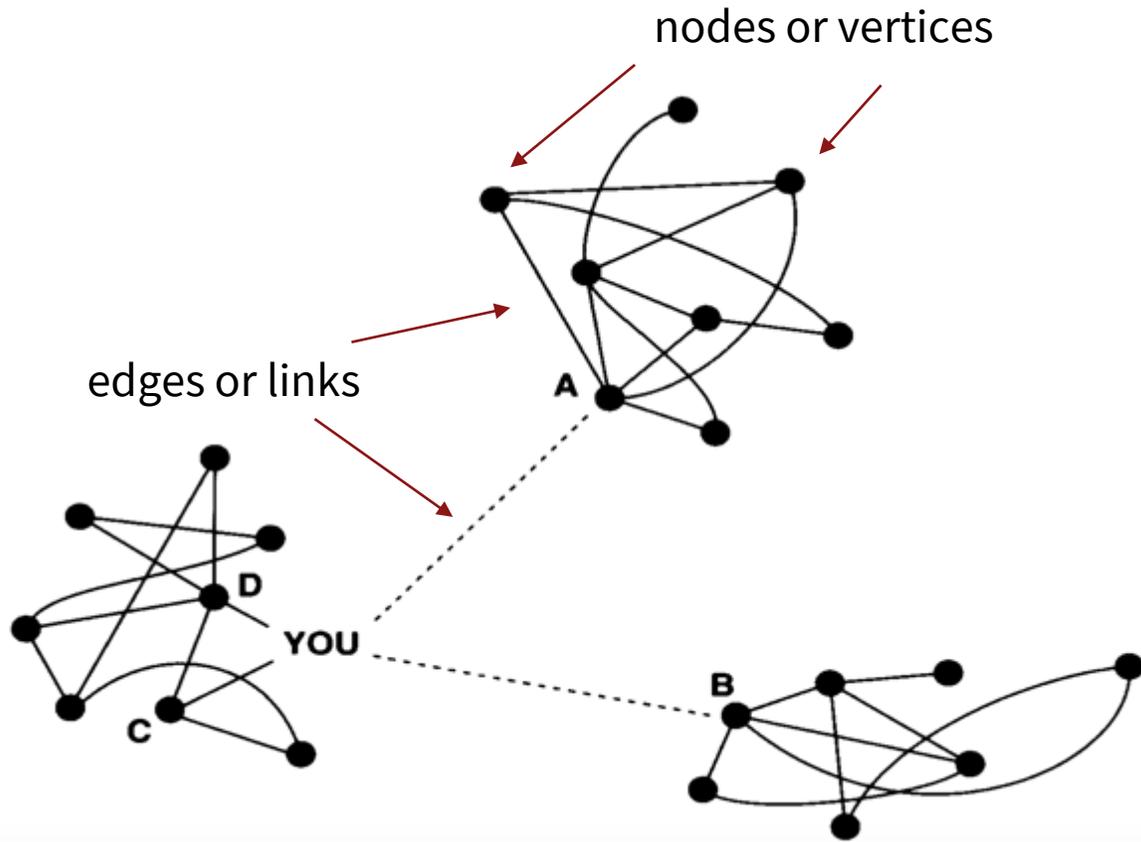


A brief introduction to social network analysis

A social network can be defined as a set of relations that apply to a set of actors, as well as any additional information on those actors and relations (Prell, Christina. 2012).



Different ways of measuring how central an actor is...



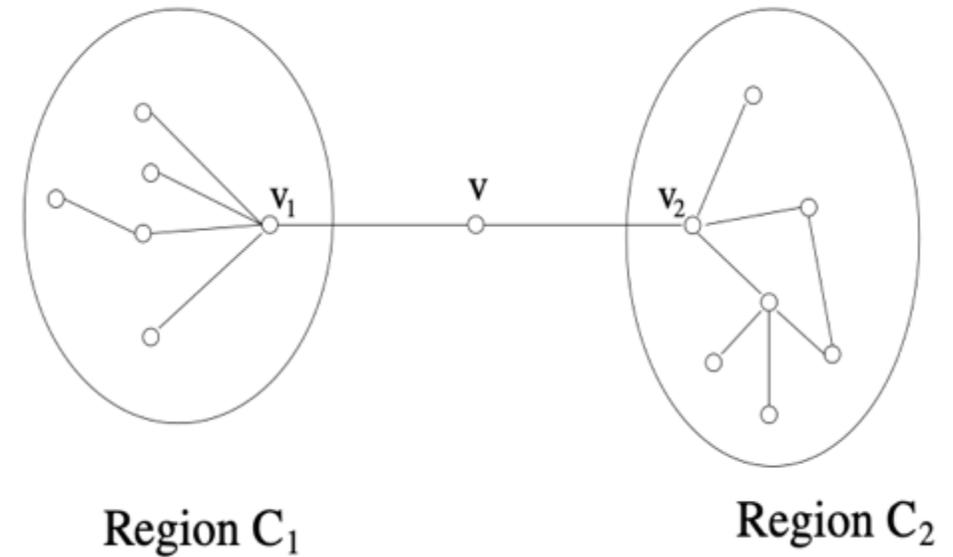
----- weak ties
___ strong ties

- Degree;
- Indegree;
- Outdegree;
- Eigenvector;
- **Betweenness.**

Betweenness Centrality

$$g(v) = \sum_{s \neq v \neq t} \frac{\sigma_{st}(v)}{\sigma_{st}}$$

where σ_{st} is the **total number of shortest paths** from node s to node t and $\sigma_{st}(v)$ is the **number of shortest paths** from s to t **going through v** .



“Weak ties provide people with access to information and resources beyond those available in their own social circle; but strong ties have greater motivation to be of assistance and are typically more easily available.” (Granovetter, 1983, p.209).

Motivation

- Previous attempts have discussed how academic productivity is affected by endogamy, however, **little is known about research collaborations...**
- Nowadays, **knowledge** production and **innovation** require the crossing of **scientific boundaries**.
- A **study** in which **social network methods** are applied to describe such type of academic environment **is yet to be published**.



The Study

- Brazilian elite research universities have high numbers of native scholars. In such an environment, a high number of redundant contacts would be expected. Studies show closed networks miss out on opportunities for the exchange of new information;
- The University of São Paulo – USP is an elite research institution in which close to 70% of its faculty members are graduate alumni (PhD);
- Who do these scholars collaborate with? Are they more likely to work within their own ego networks?

Data

- Base lattes (Brazilian Scientific Council - CNPq)
 - 209 faculty from agricultural sciences in the University of São Paulo (lattes id)
 - High collaboration, prestigious field nationally / internationally
 - 20 years of research collaboration (coauthoring papers / conferences)
 - Around 8,050 unique nodes
 - 59,763 edges

Scriptlattes



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Silvia Renata Gaido Cortopassi

Endereço para acessar este CV: <http://lattes.cnpq.br/0016273968912055>

ID Lattes: 0016273968912055

Última atualização do currículo em 20/04/2020

Possui graduação em Medicina Veterinária Campus Botucatu pela Universidade Estadual Paulista Júlio de Mesquita Filho (1987), mestrado em Patologia Experimental e Comparada pela Universidade de São Paulo (1993) e doutorado em Clínica Cirúrgica Veterinária pela Universidade de São Paulo (1997). Atualmente é professor Livre-docente da Faculdade de Medicina Veterinária e Zootecnia da Universidade de São Paulo. Tem experiência na área de Medicina Veterinária, com ênfase em Anestesiologia e Terapia Intensiva, nas espécies domésticas e selvagens. (Texto informado pelo autor)

Identificação

Nome Silvia Renata Gaido Cortopassi

Nome em citações bibliográficas CORTOPASSI, S. R. G.; Cortopassi, Silvia R G.; Cortopassi, S.R.G.; Cortopassi, Silvia Renata Gaido; Cortopassi, Silvia R G.; Cortopassi, Silvia Renata G.; CORTOPASSI, SILVIA R. G.; CORTOPASSI, SG; CORTOPASSI, SILVIA RG.

Lattes ID <http://lattes.cnpq.br/0016273968912055>

Endereço

Endereço Profissional Universidade de São Paulo, Faculdade de Medicina Veterinária e Zootecnia, Departamento de Cirurgia, AV PROF DR ORLANDO MARQUES DE PAIVA,87 CIDADE UNIVERSITÁRIA BUTANTÃ 05508000 - São Paulo, SP - Brasil
Telefone: (11) 30911233
Fax: (11) 30911233
URL da Homepage: <http://www.fmvz.usp.br>

Formação acadêmica/titulação

1993 - 1997 Doutorado em Clínica Cirúrgica Veterinária (Conceito CAPES 5).
Universidade de São Paulo, USP, Brasil.
Título: EMPREGO DO ÓXIDO NÍTRICO INALÁVEL EM CÃES SUBMETIDOS AO CHOQUE HEMORRÁGICO. ESTUDO EXPERIMENTAL., Ano de obtenção: 1997.

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- <http://lattes.cnpq.br/0016273968912055> (09/12/2019)
- Rótulo/Grupo: Native_Scholar
- Bolsa CNPq:
- Período de análise: 2000-2019
- Endereço: Universidade de São Paulo, Faculdade de Medicina Veterinária e Zootecnia, Departamento de Cirurgia, AV PROF DR ORLANDO MARQUES DE PAIVA,87 CIDADE UNIVERSITÁRIA BUTANTÃ 05508000 - São Paulo, SP - Brasil Telefone: (11) 30911233 Fax: (11) 30911233 URL da Homepage: <http://www.fmvz.usp.br>
- Grande área: Ciências Agrárias
- Área: Medicina Veterinária
- Citações: [Google Acadêmico](#)

Produção bibliográfica

- Artigos completos publicados em periódicos (58)
- Livros publicados/organizados ou edições (2)
- Capítulos de livros publicados (29)
- Textos em jornais de notícias/revistas (1)
- Trabalhos completos publicados em anais de congressos (0)
- Resumos expandidos publicados em anais de congressos (3)
- Resumos publicados em anais de congressos (75)
- Artigos aceitos para publicação (1)
- Apresentações de trabalho (73)
- Demais tipos de produção bibliográfica (0)

Produção técnica

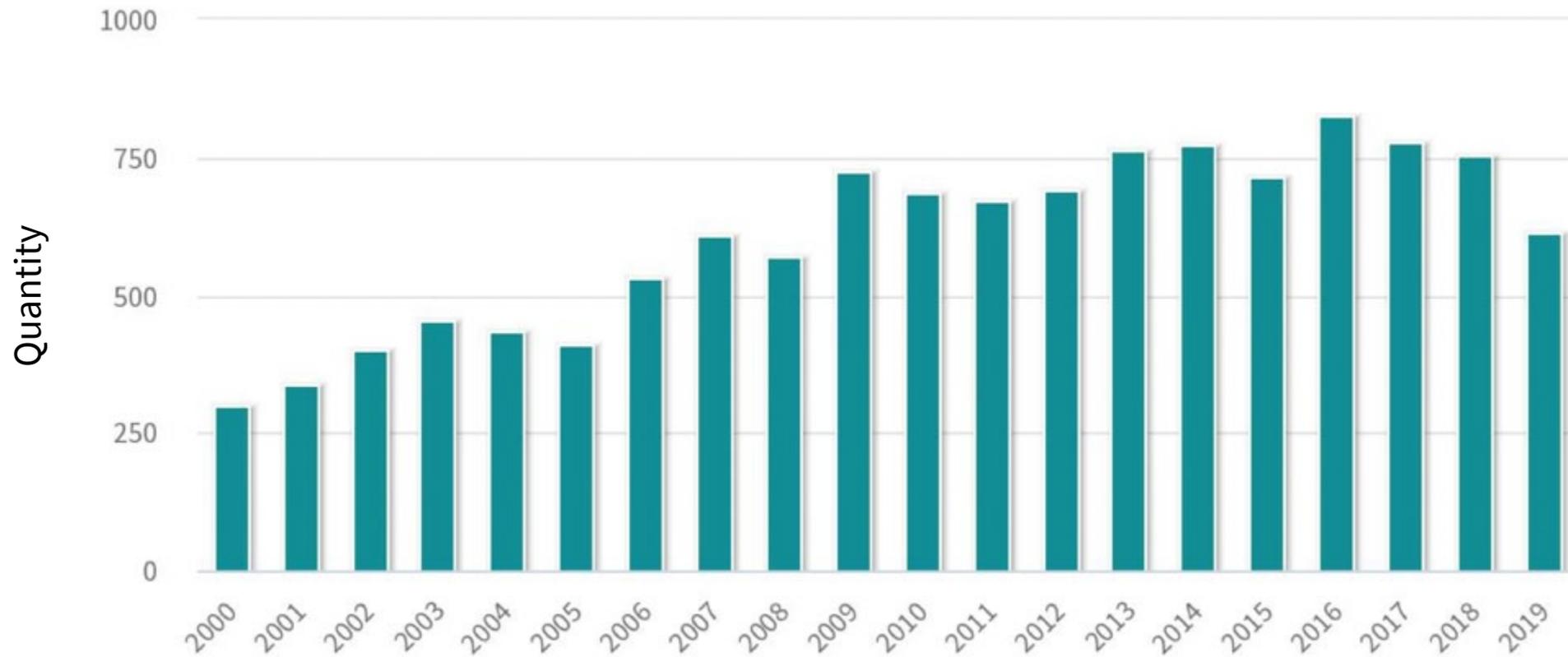
- Programas de computador com registro de patente (0)
- Programas de computador sem registro de patente (0)
- Produtos tecnológicos (0)
- Processos ou técnicas (0)
- Trabalhos técnicos (13)
- Demais tipos de produção técnica (2)

Produção artística

- Total de produção artística (0)

Orientações em andamento

Total papers published per year



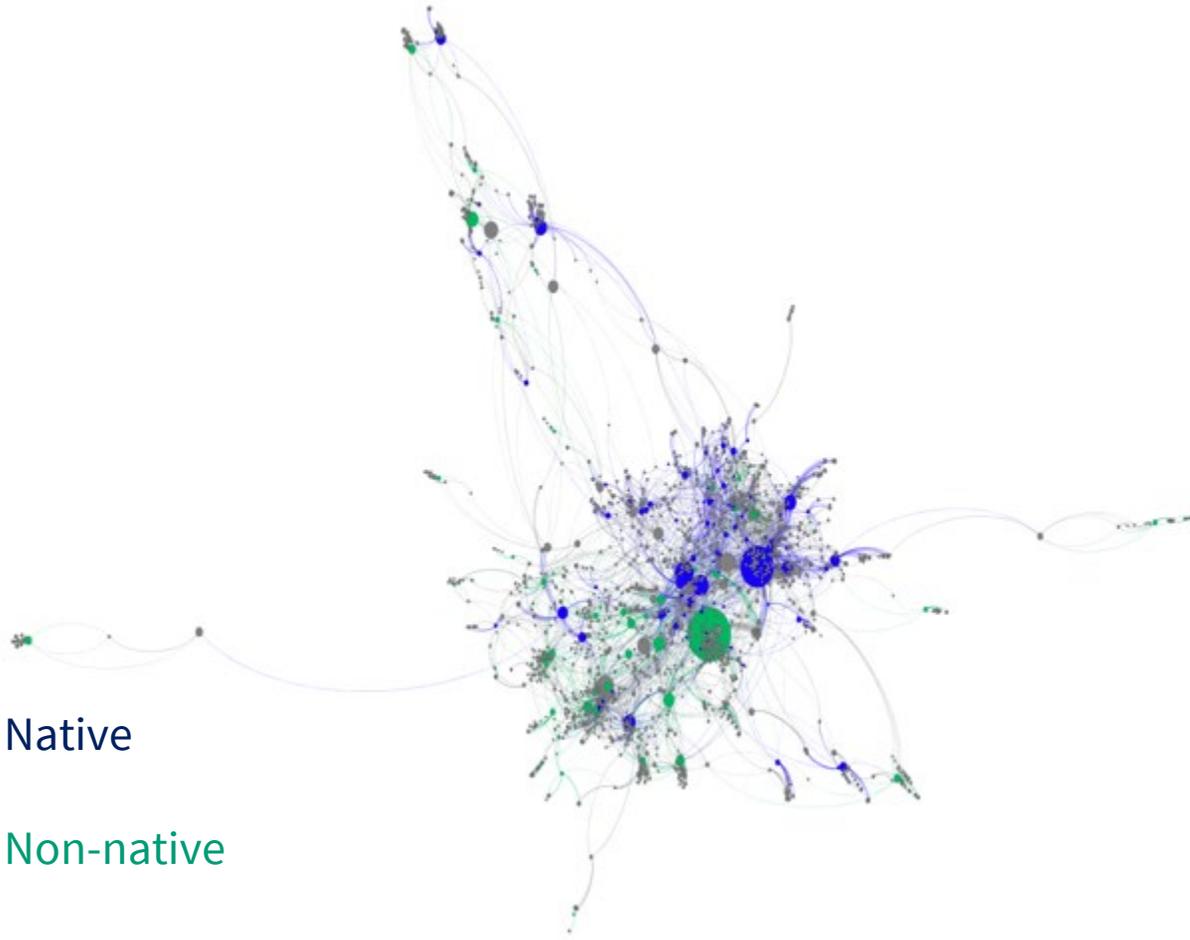


Research Questions

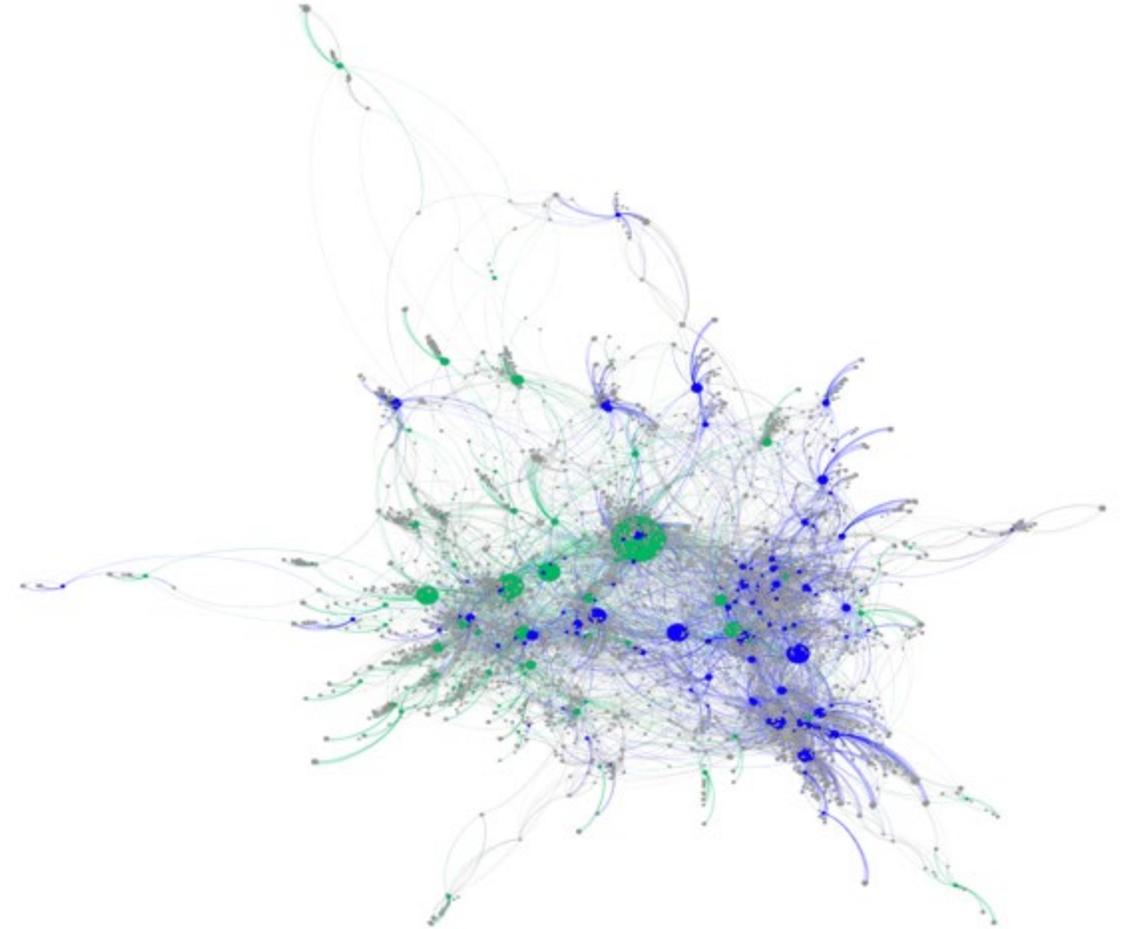
- 1 How is information exchanged and knowledge produced in a homogeneous academic environment?**
- 2 Are faculty members incentivized to or discouraged from exploring gaps of knowledge in their own networks?**
- 3 What benefits do non-native/mobile scholars bring to these communities in relation to the flow of information and to research collaboration opportunities?**

Research Collaboration Networks

2000 - 2003



2004 - 2007



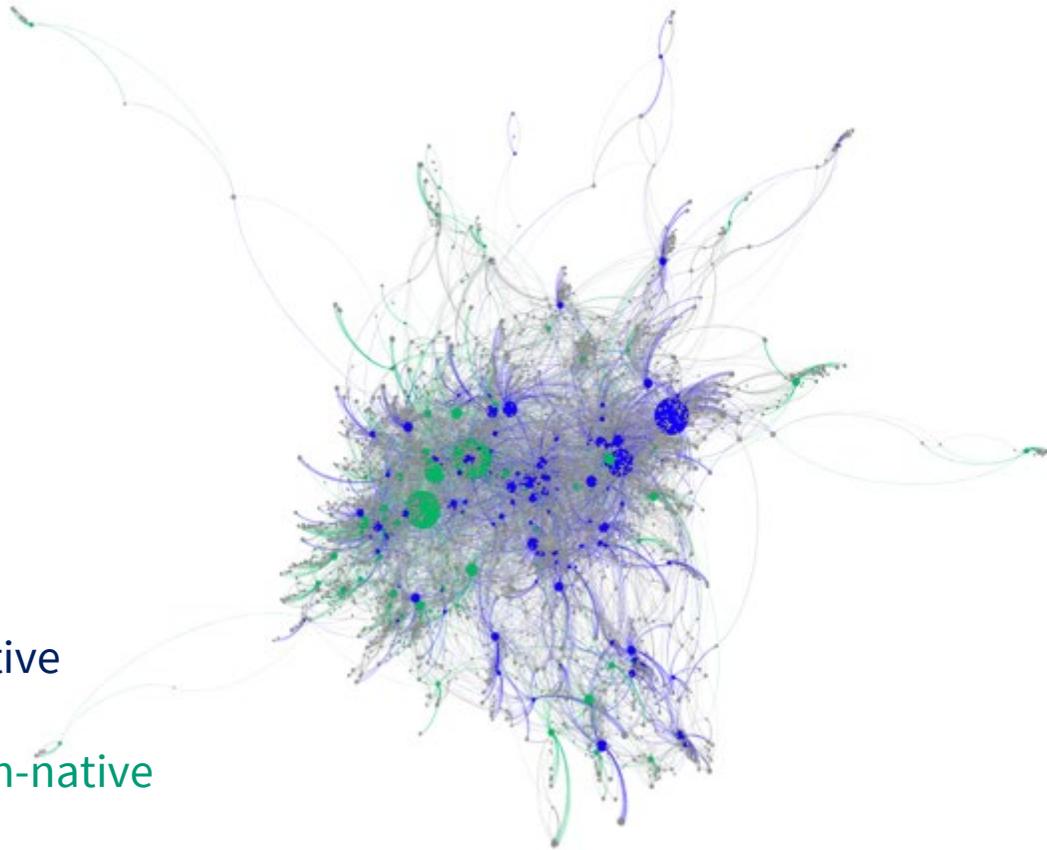
Native

Non-native

Alter

Research Collaboration Networks

2008 - 2011

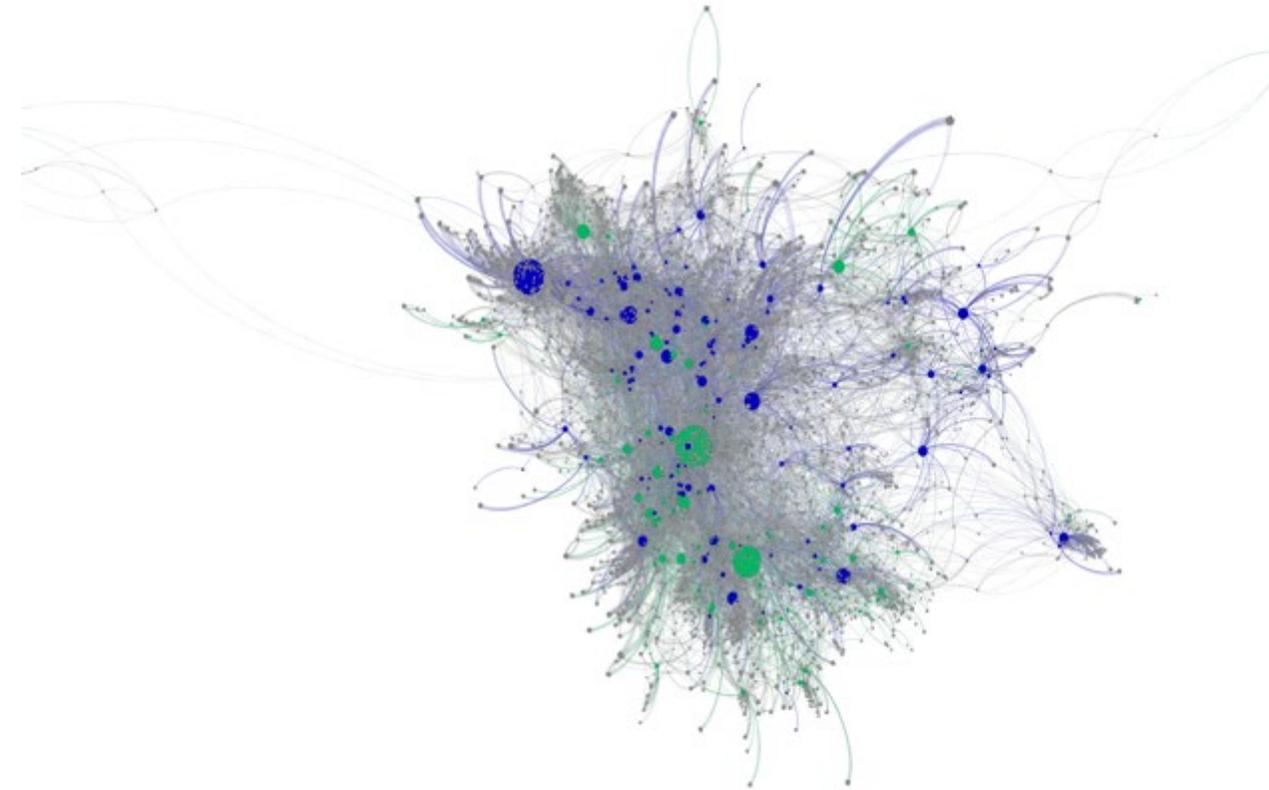


Native

Non-native

Alter

2012 - 2015



Research Collaboration Networks

2016 - 2019

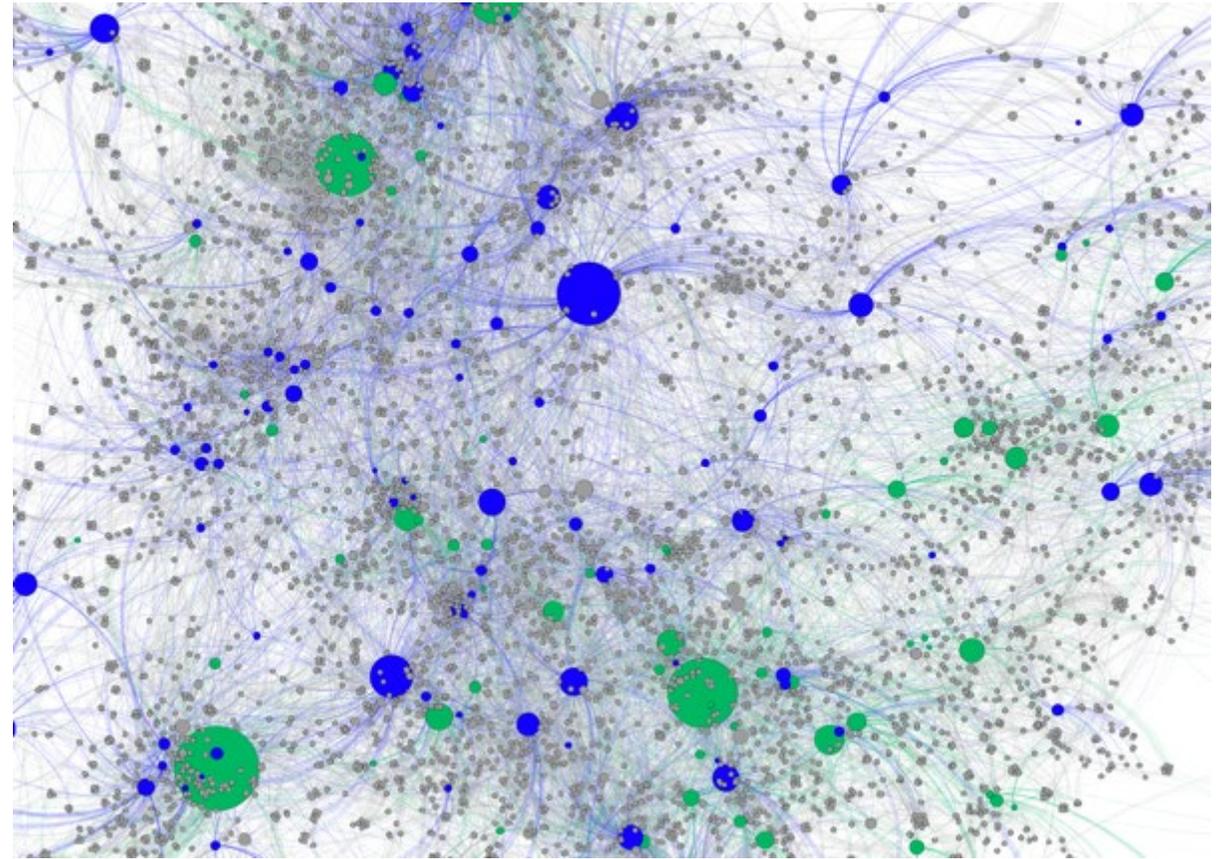
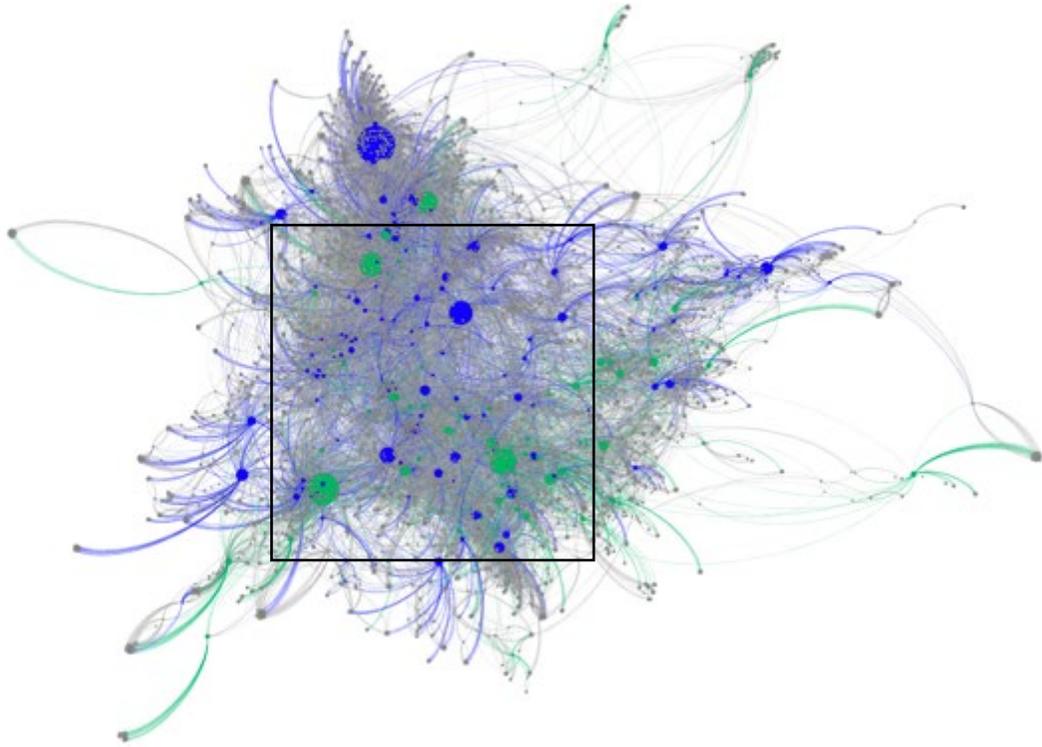


Table 1 - Estimated Effect on Betweenness Centrality (2000-2019)

VARIABLES

Native Scholar	-24,139.851*** (6,824.165)
n_papers	39,148.747*** (2,160.393)
n_conf_papers	3,334.803** (1,336.249)
Female	-31,912.079*** (6,535.374)
Faculty's age	-849.995 (579.813)
Reported Intern'l Academic Mobility	-39,610.621*** (7,089.321)
Years of experience	-121.321 (647.701)
Constant	29,130.874 (21,243.850)
Observations	4,006
R-squared	0.540
Year Fixed Effects	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Next steps

- Control for number of graduate advisees
- Apply an **Exponential Random Graph Model (ERGM) Meta Network Analysis**
 - ERGM is a useful tool to measure not only how ties are formed, but also how structurally constrained they are.
- Compare the results to another field of knowledge within USP

Takeaways

- Research collaborations in the field of agricultural sciences is continuously growing at USP
- Faculty members seem to be incentivized to exploring gaps of knowledge, however, the networks seem to describe a mix of two models:
 - Small-world model (Milgram, 1967): connections of scholars through shared acquaintances in a locally clustered environment; and
 - Scale-free model (Barabási & Albert, 1999): preferential attachment relations, centralizing the organization on prestigious faculty.
- Finally, non-native scholars are more likely to function as bridges to non-redundant contacts, helping exchange information among their own academic networks.



Thank you!
Obrigado!

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