Recommending Intra-Institutional Scientific Collaboration through Coauthorship Network Visualization

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Agenda

- Scientific Collaboration
- Best practices
- Potential Collaboration Index (PCI)
- Scientific Collaboration Diagram
- Case Study
- Results
- Conclusions
- Future Work

Scientific Collaboration

- **Researchers**
  - Identifying colleagues with similar or complementary expertise to improve or foster a research.
- **Institution**
  - knowledge transfer from experienced to new researchers.
  - Having a robust scientific network.
  - Allocating resources in strategic research areas.

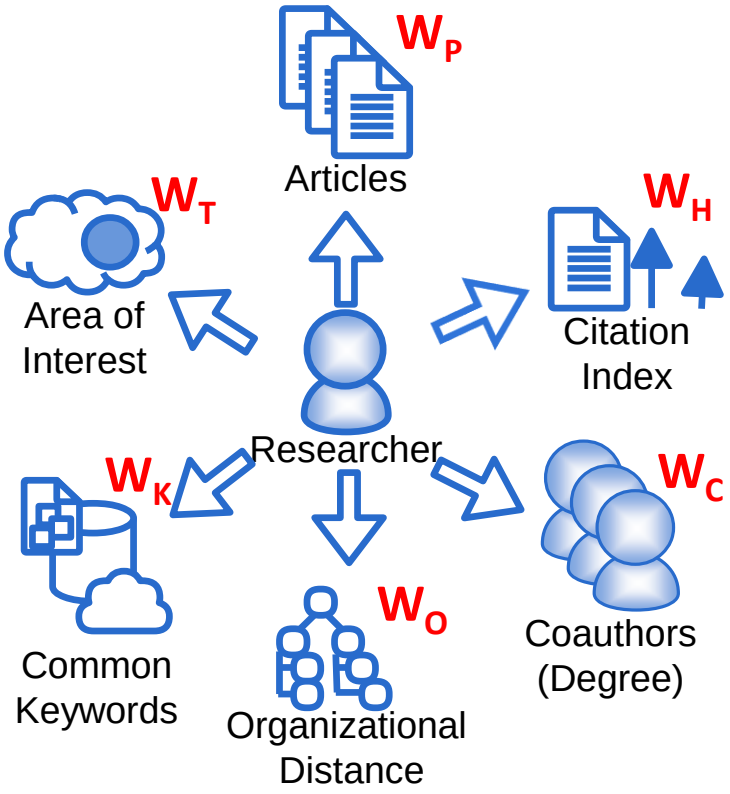
Scientific Collaboration best-practices

- **Join to groups**
- **Expand your collaboration network**
- **Look for popular and prestigious partners**
- **Rank your choices**
- **Keep in touch with former collaborators**
- **Close triangles**
- **Choose close collaborators**

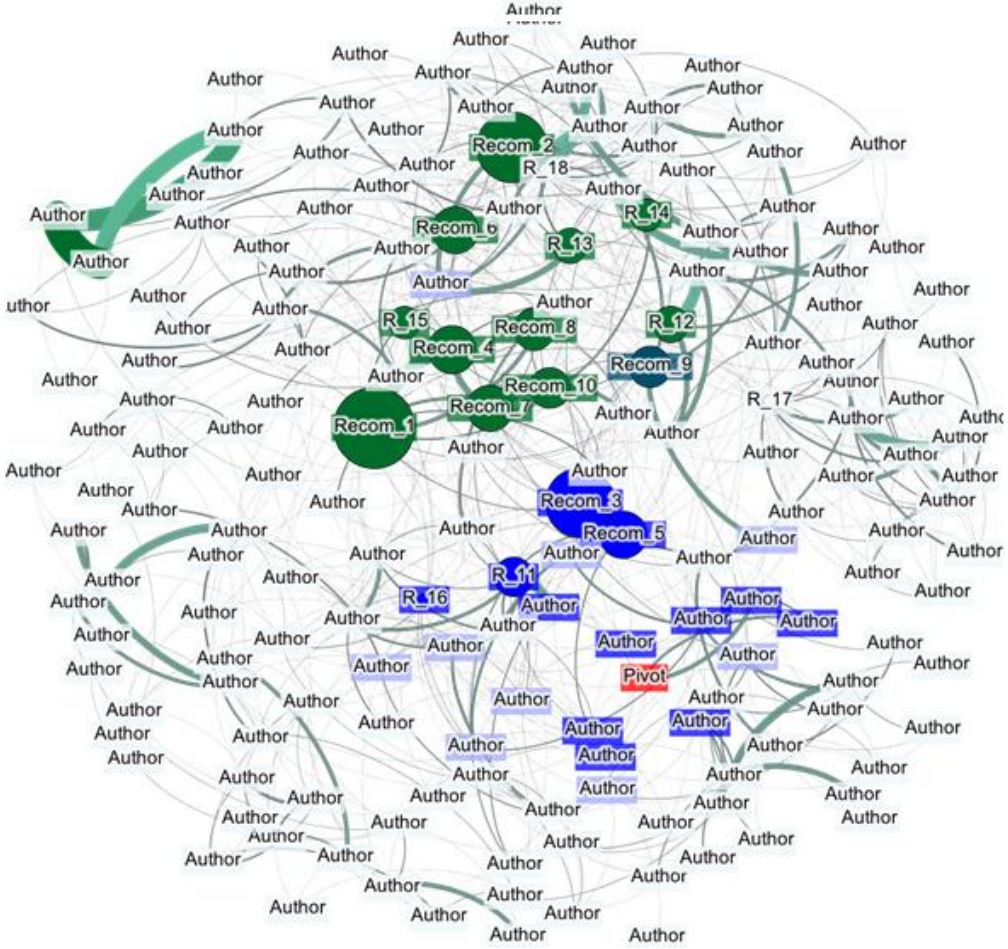
Potential Collaboration Index (PCI)

$$PCI = (0.2 \cdot W_C + 0.2 \cdot W_P + 0.2 \cdot W_H + 0.2 \cdot W_K + 0.2 \cdot W_O) \cdot W_T$$

- Co-authorship network
- SNA metrics: Degree
- Calculate WO, WK and WT between each node pair.



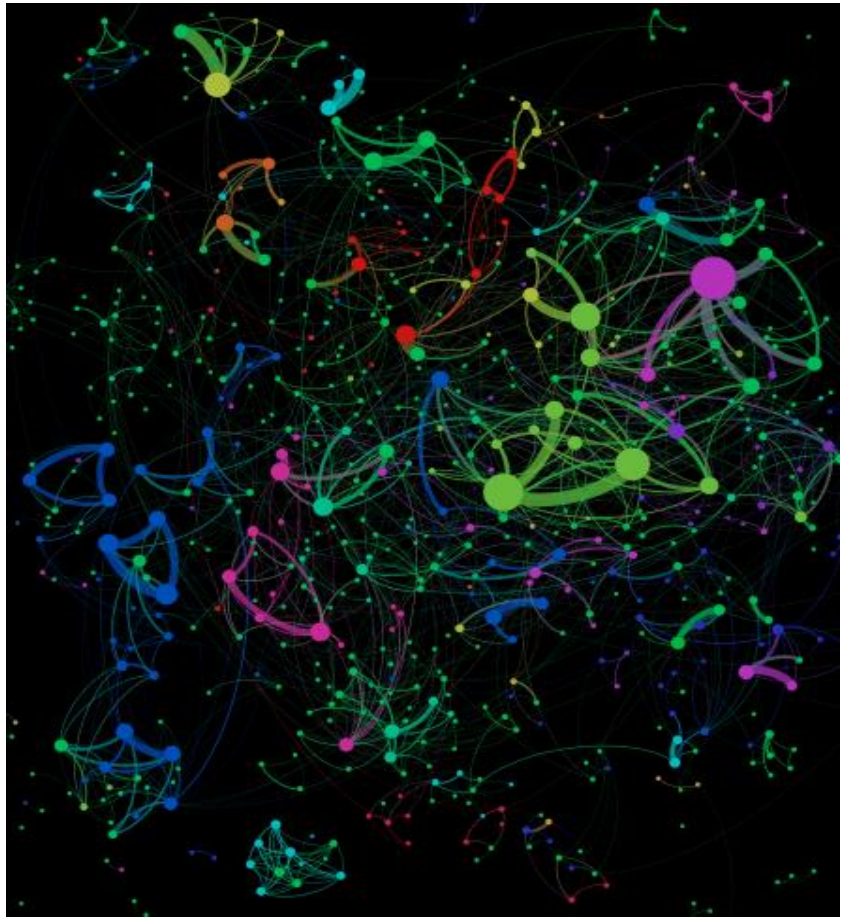
Scientific Collaboration Diagram



- Pivot researcher
- Direct and indirect collaborators
- Node size ranked by PCI.
- Edge size indicates collaboration strength.
- Top 200 PCI researchers plotted

Case Study at Tecnologico de Monterrey

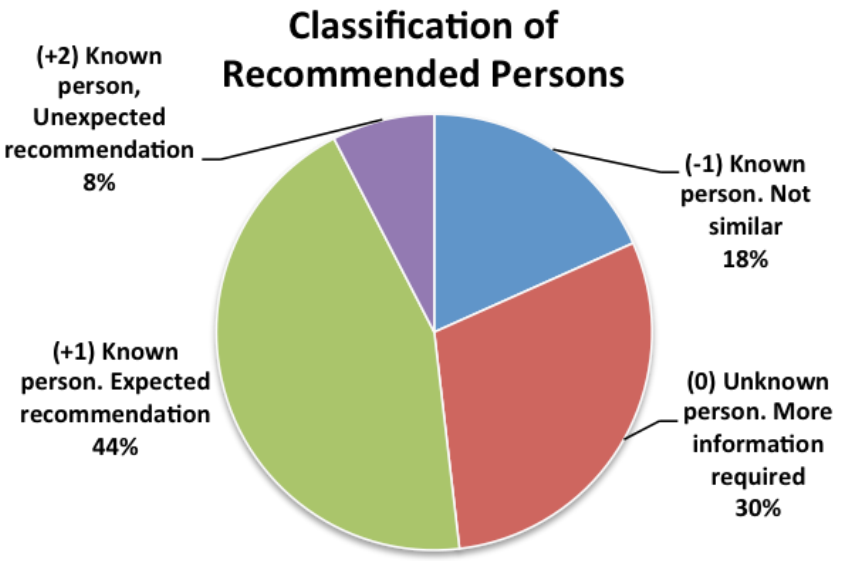
- 926 researchers
- 124 research groups
- 15 strategic areas
- 7 campuses
- Coauthorship in Books, Chapters, Articles, and InProceedings.



Coauthorship Network colored by area

Results

- **27 interviews**
  - 19 (very) useful.
  - 5 regular.
  - 3 not useful
- **Feedback**
  - Top 18 recommendations
  - List of expected colleagues



Selection	Avg. Relevant Persons (+2)	Avg. Listed Expected Persons	Avg. Precision	Avg. Recall	F-measure on Avg. Precision and Avg Recall
Top 3	20.0%	13.0%	0.538	0.219	0.311
Top 10	18.9%	18.9%	0.404	0.459	0.430
Top 18	7.6%	32.5%	0.336	0.665	0.446

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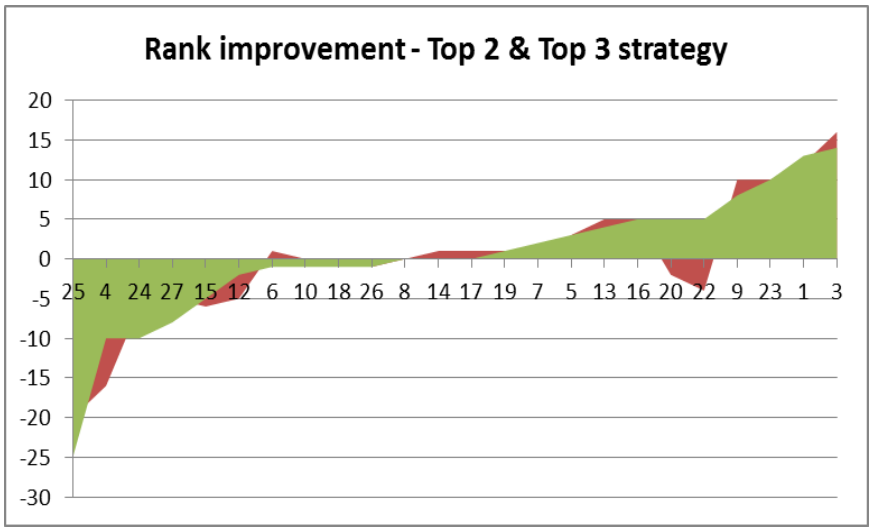
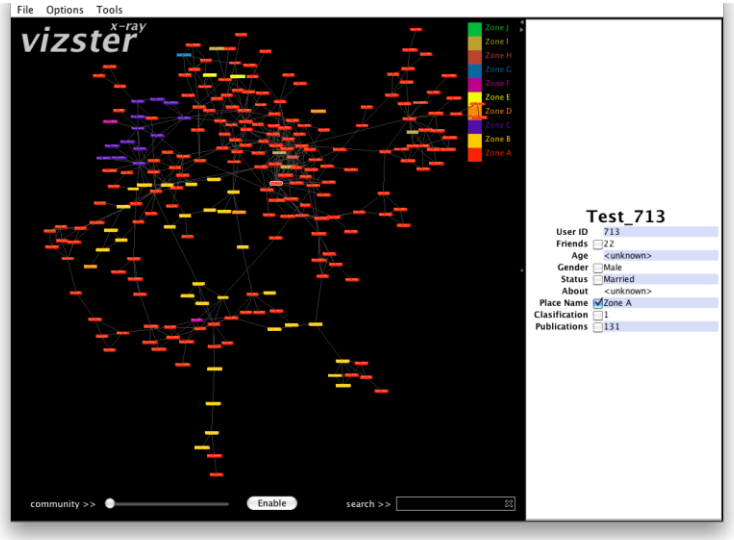
Conclusions

- The PCI makes visual recommendation manageable in large networks.
- Most of the researchers considered the diagram useful.
- Top 18 recommendations: 52% good, 18% bad
  - 30% of the recommendations could not be classified due to lack of information.
- Main drawbacks
  - looking for complementary/specific expertise
  - relationships not considered (e.g. thesis committees).

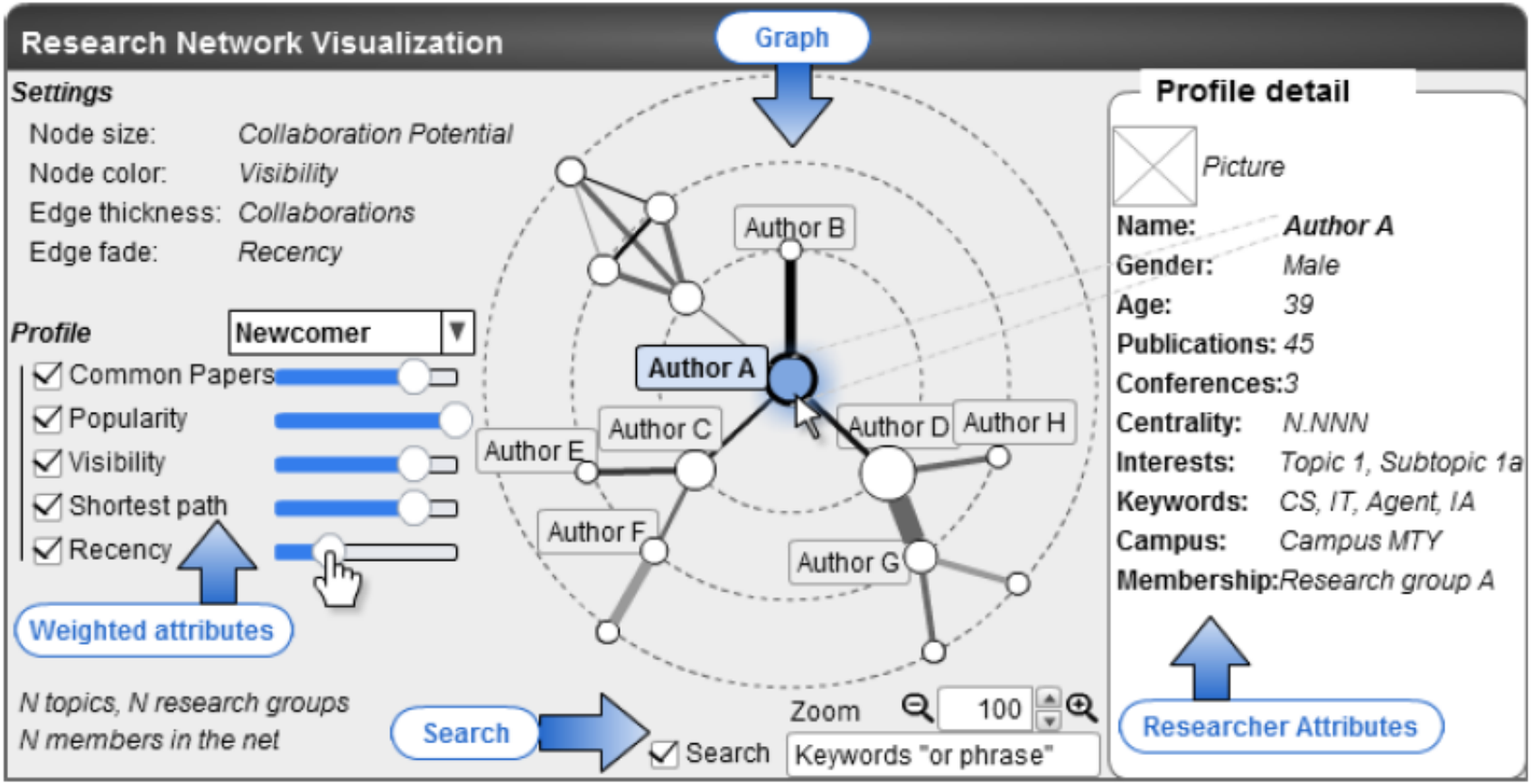
Future Work

- Analyzing recommendations of interviewed researchers.
- Allow the user to equalize PCI factor weights.
- Connect directly to the publications database and explore results with Vizster.





FW: An interactive tool for collaboration recommendation



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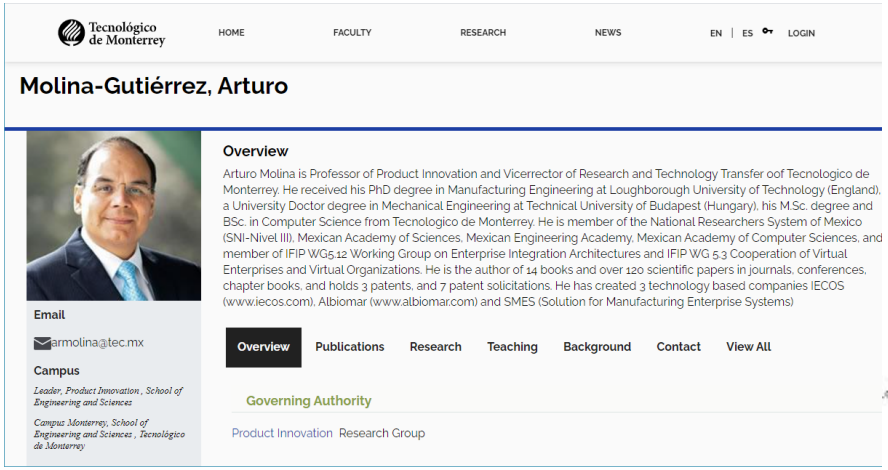

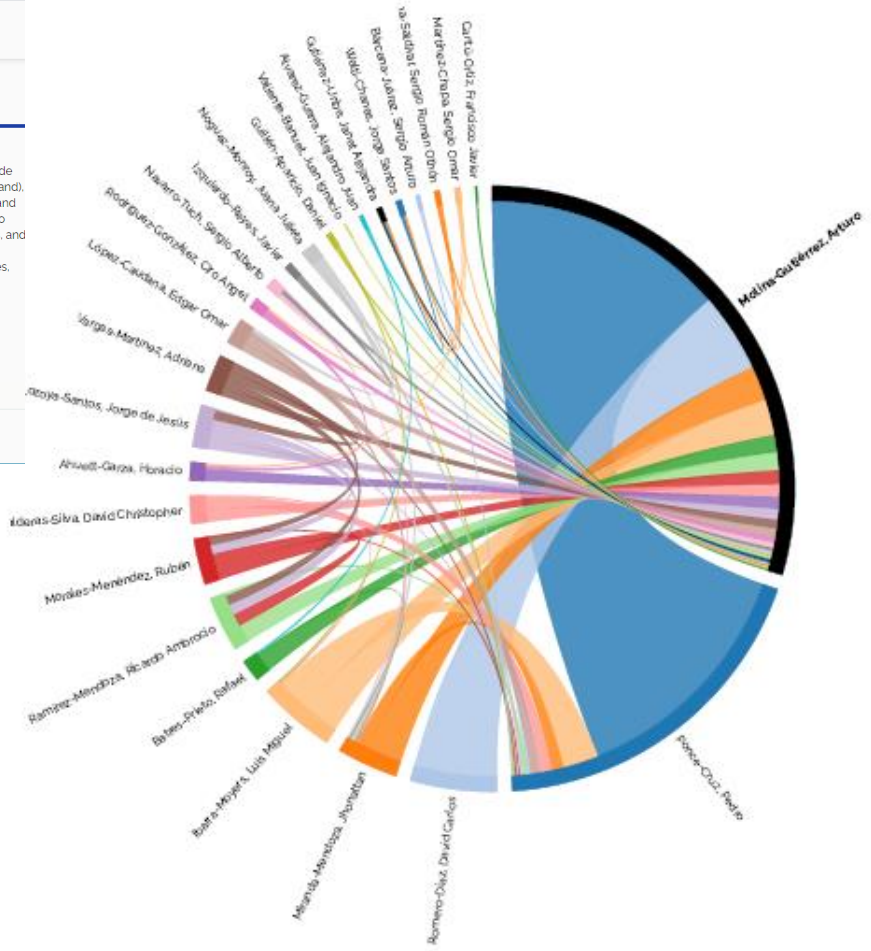

291 publications
from **2001 - 2020**

24 co-authors
from **2004 - 2020**

More info: Gustavo Parada. Research Network Visualization to foster Intra-Institucional Scientific Collaboration. Tecnologico de Monterrey. Masters on IT Administration. May 2013.

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Q & A