

# Exploring Avenues to Prepare STEM Practitioners for Global Impact in Research & Industry

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# ACS in a Global Context

- ACS is the world's largest individual science organization
  - Over 24,000 members outside the U.S.
- Chartered by the U.S. Congress to advance the field of chemistry and related science
  - Provide access to top peer-reviewed journals
  - Provide access to multiple scientific databases
  - Scientific conferences
  - Public education, advocacy, support the field broadly\*
- Unique in that our charter *mandates* global involvement
  - Mission: *Advancing the broader chemistry enterprise for and its practitioners for the benefit of Earth and its people*

# Global Challenges in STEM Curriculum



- The chemistry community has long prepared its trainees for careers in basic research
  - However, 51% of ACS members work in industry, thus creating a huge gap
- Some difficulty in convincing US-based PI's on value of sending trainee abroad for short or long-term study
  - Prevailing culture of questioning value
    - [Simply follow the data](#)
- Curriculum restrictions create hurdles for STEM students to engage globally (i.e. semester long studies not practical)
  - Gave rise to funding of IREU Programs (still rather elusive)
  - Relatively few electives allowed in strict STEM programming

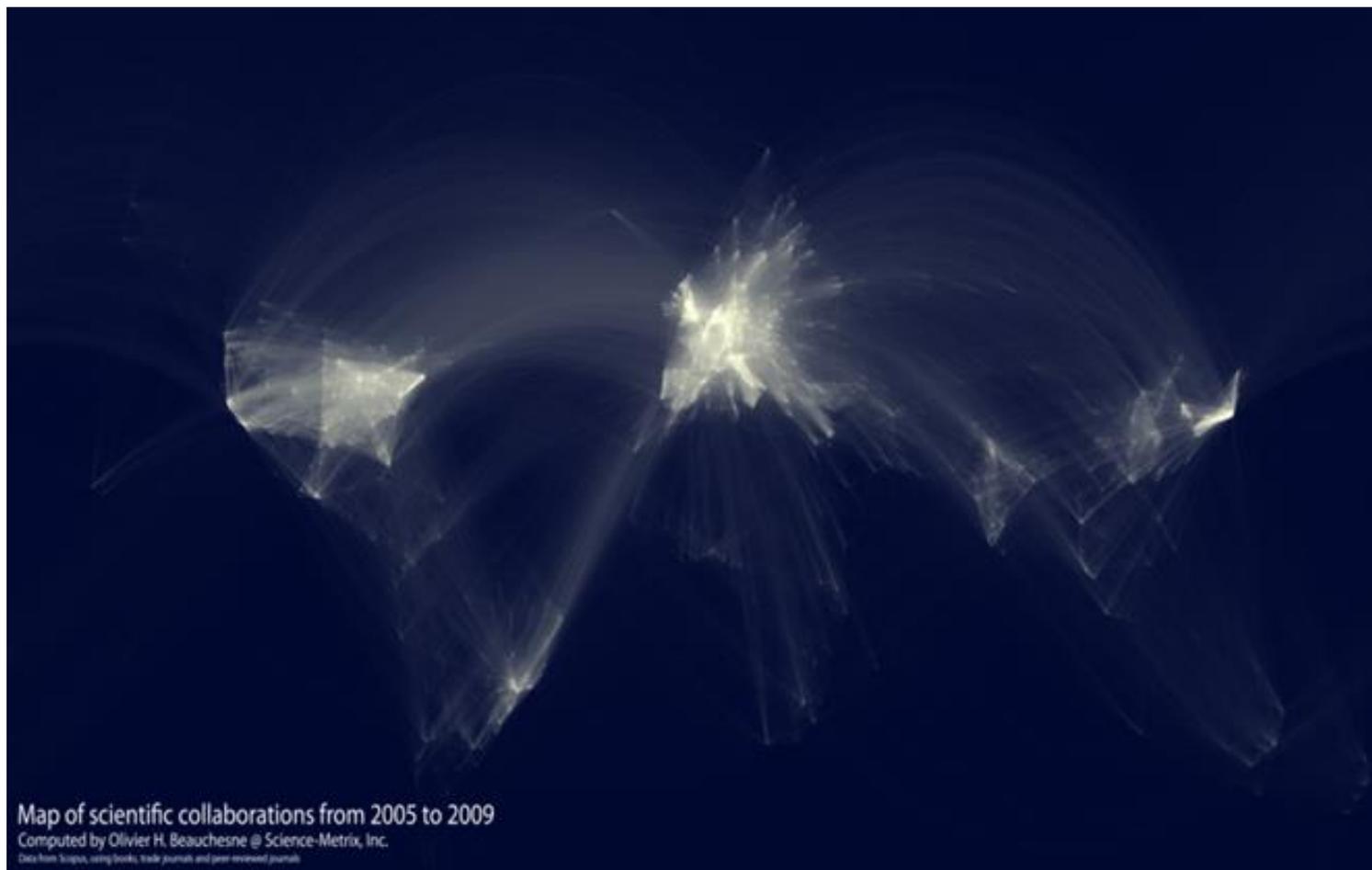
# Adding Industry Perspective

- U.S. based institutions fall behind in promoting industrial ties
  - European funders often require ties with industry
- Impact on long-term global competencies?
  - In the research lab:
    - Exposure to culture through hosting scholars
    - BUT, research is generally guided on your own-team mentality is less ardent
    - Global collaboration is key, but *first author* stress
  - In the industry lab:
    - You interact with your colleagues in a *cross-functional* manner
    - Stronger interpersonal skills
    - One part of the puzzle/solution-less focus on research prestige
- ACS Industry Member Programs working in enhanced training

# ACS Global STEM Outreach

- ACS has long been committed to promoting global collaboration in research and training
  - 2005 Open Doors Report: 16%
  - 2016 Open Doors Report: 24%
- Scientists are beginning to catch on to what business and humanities have known all along!
- ACS IREU Program
  - NSF Funded Program for 16 students annually
  - Short-term lab stay, presentation at ACS National Meeting
- [ACS International Center](#)
  - Virtual Hub of resources, funding opportunities for STEM community
  - Events (live and virtual)

# Map of Global Scientific Collaborations from 2005-2009



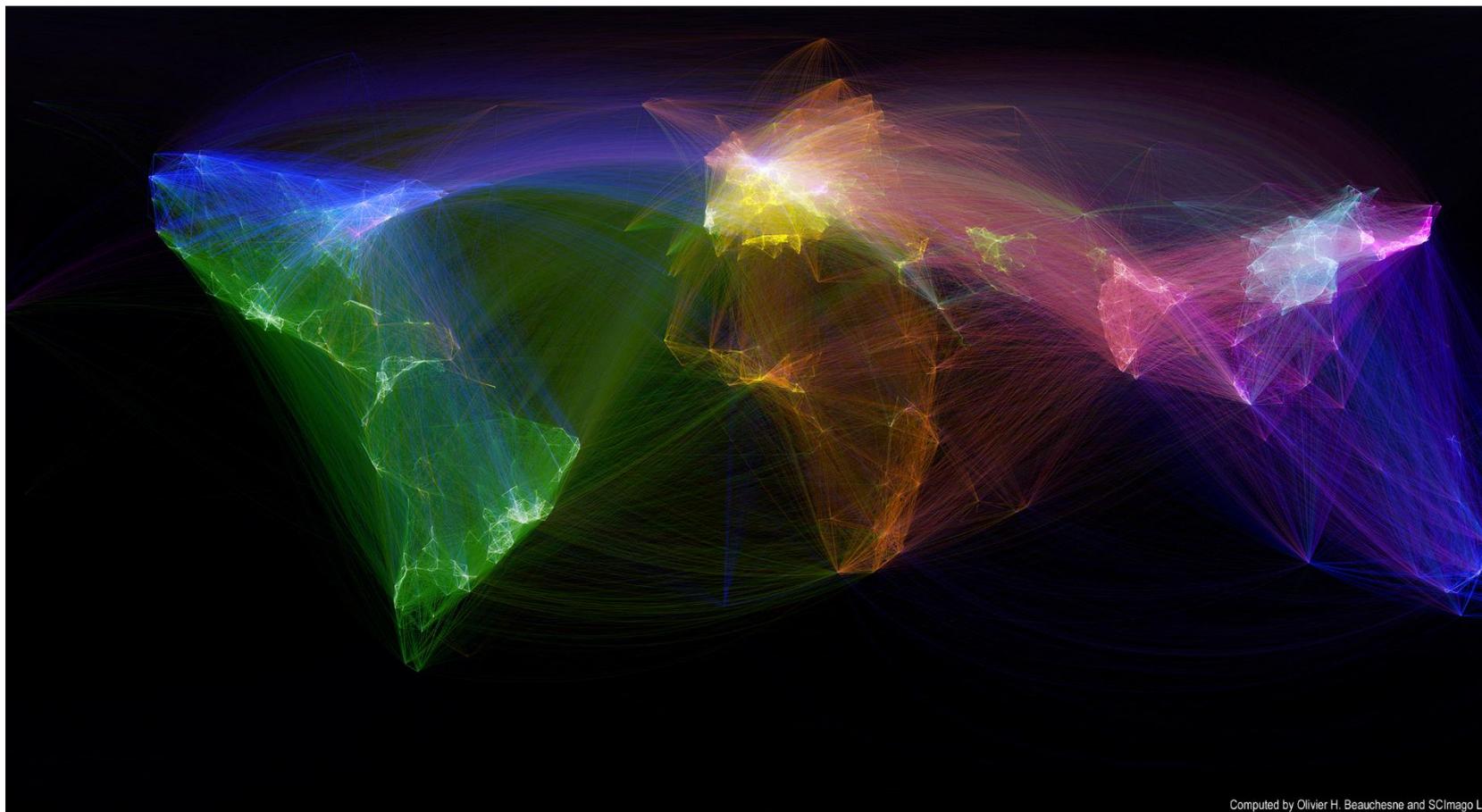
Computed by Olivier H Beauchesne at Science-Metrix, Inc  
Data from Scopus using books, trade journals, & peer reviewed journals

# Global Impacts of Initiatives ACS & Beyond



- ACS IREU Program leads to global thinking in STEM
  - One of the few organizations to have an iREU
  - Results are trickling in, but:
    - In 2015 alone 2/17 students went on to international grad programs
    - In 2016 program: 1 program accepted in Erasmus Mundus (only American)
  - “This program made global collaboration *attainable*”
- ACS International Center as a hub
  - We want the STEM community to have access
- Four years on:
  - Over 130,000 unique visitors
  - 60/40 ratio in traffic
- New Horizons
  - We’ve made it easier
  - Media for the future

# Map of Global Scientific Collaborations 2008-2012



Computed by Olivier H. Beauchesne and SCImago Lab

Computed by Olivier H Beauchesne at MindGeek  
Data from Scopus using books, trade journals, & peer reviewed journals

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## Where do we go from here?

- How can best prepare our STEM students to be pioneers in the future global economy?
- STEM vs. STEAM
  - What is the future of integration?
  - Role of civil society?
- How can we incorporate broader international training initiatives into the STEM curriculum? How do we make these opportunities more broadly available (i.e. diverse communities?)



# ACS

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Thank you!



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