RNLNC

PRESENTATION HANDOUT

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WASHINGTON, DC

CHALLENGE ACCEPTED

Enrollment Growth Through University-Industry Collaboration

Elmer Yglesias
American University

RNL National Conference
July 15, 2022

Enrollment Growth Through University-Industry Collaboration

- **Graduate Enrollment Environment**
- **University Industry Collaborations (UIC)**
- **UIC Initiative at American University**
- **Discussion / Q&A**

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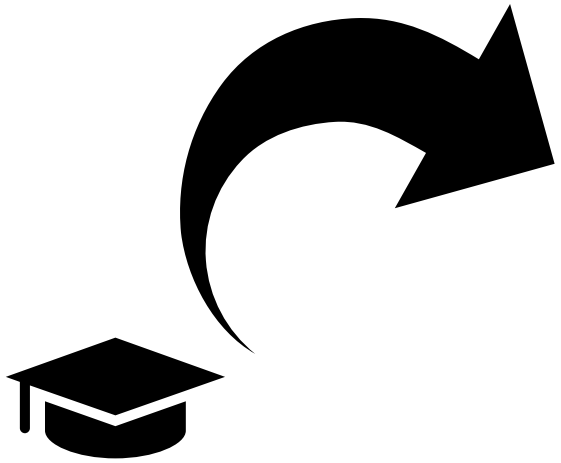
Graduate Enrollment Environment (STEM)

What are applicants looking for when they decide to pursue a [Masters] degree [in STEM]?



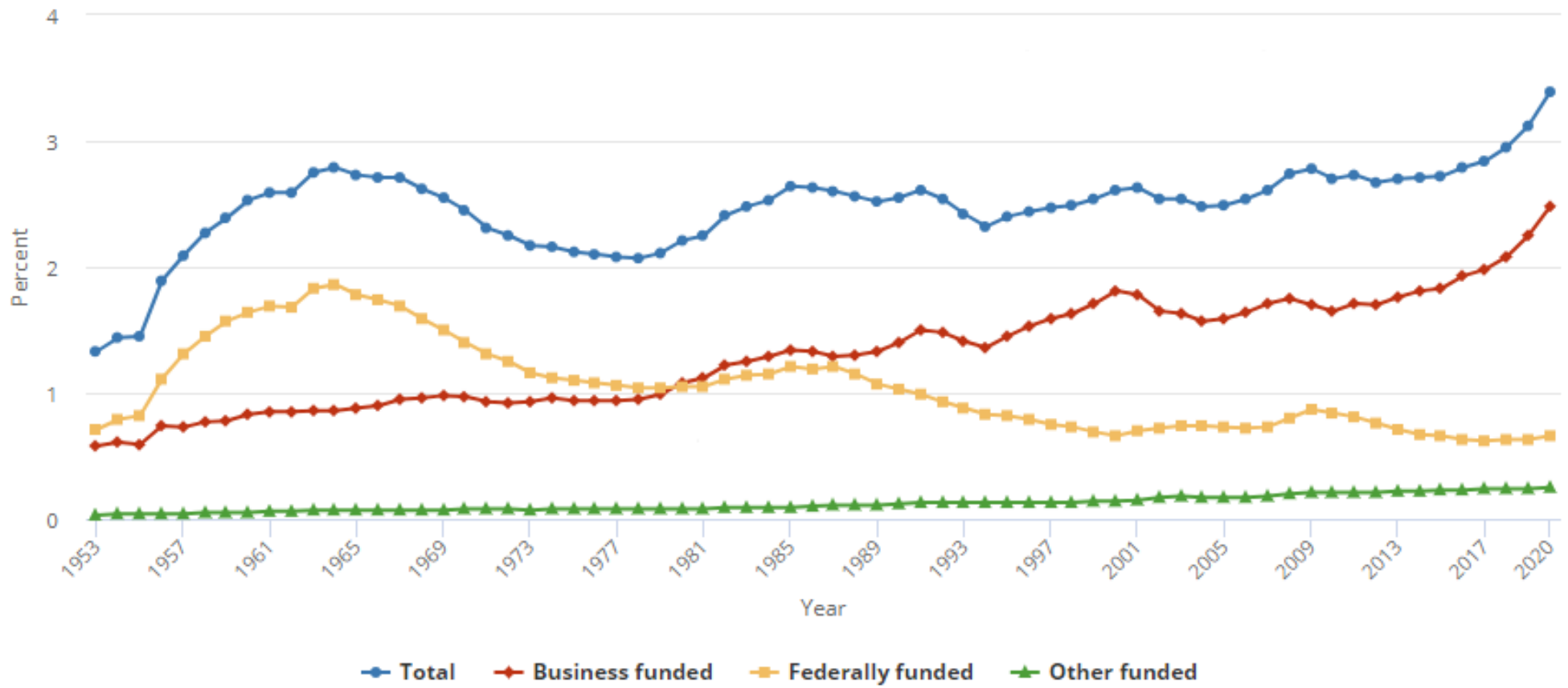
- **Higher Pay / Career Advancement**
- **Access to Network**
- **Apply Knowledge Upon Graduation / Learn new technologies & methods**
- **Reputation of Academic Program & School**
- **Opportunities to Work with Faculty in Research**

Which sector performs the most R&D in the United States?

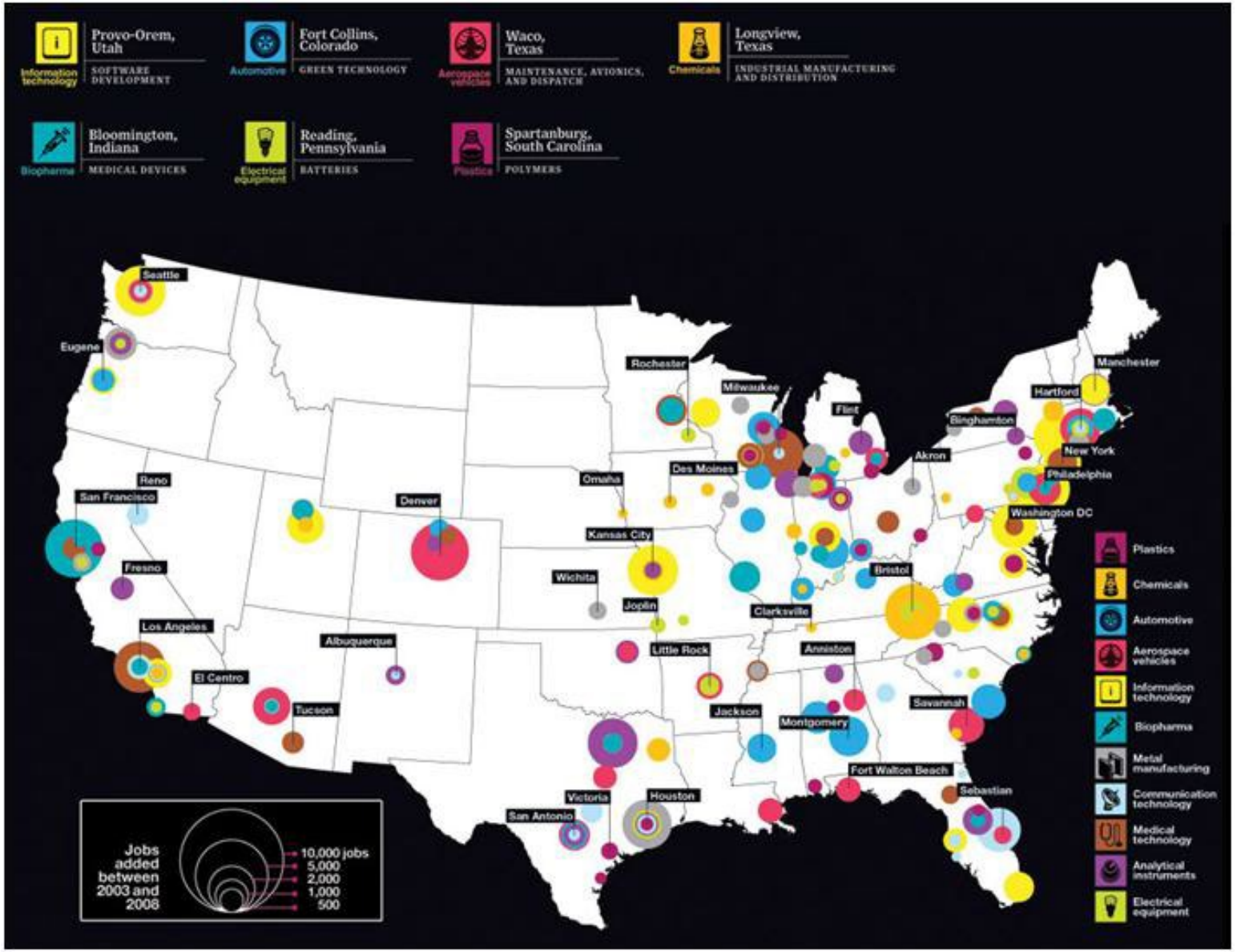
Figure RD-3

◄◄ | RD-3 | ►►

Ratio of U.S. R&D to gross domestic product, by roles of federal, business, and other funding for R&D: 1953–2020



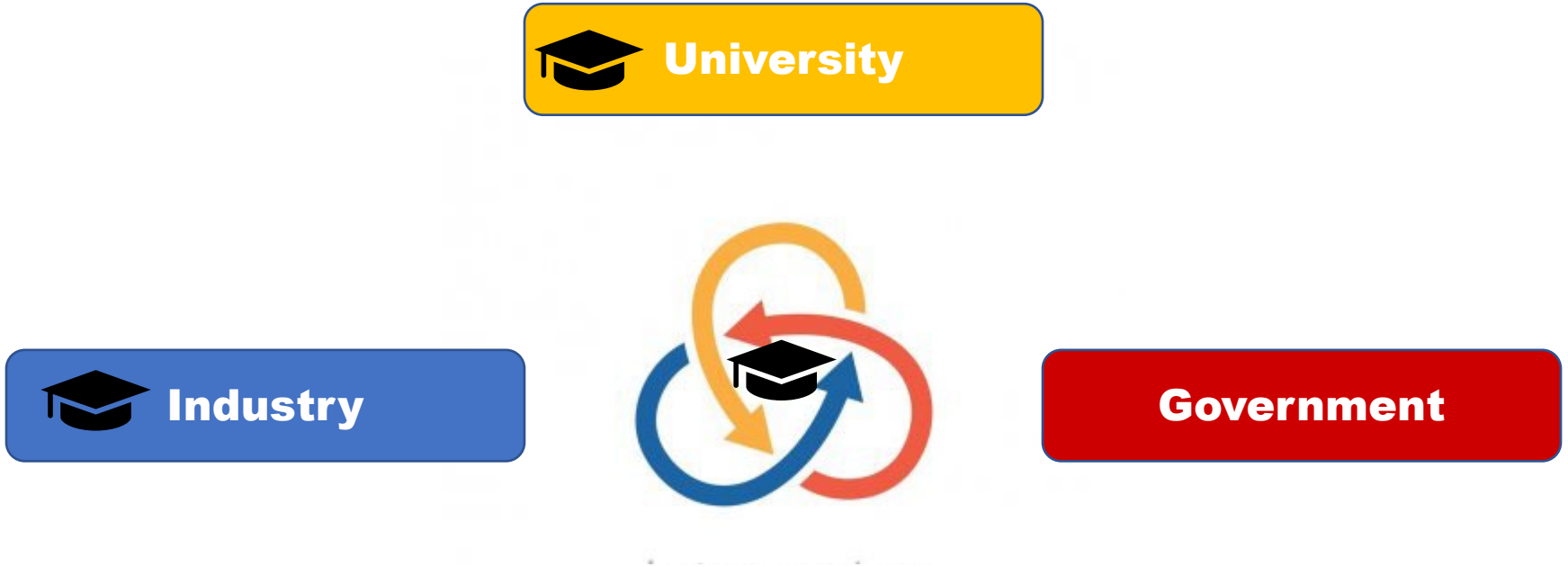
Source: National Science Board (2022)



Source Wired (2011)

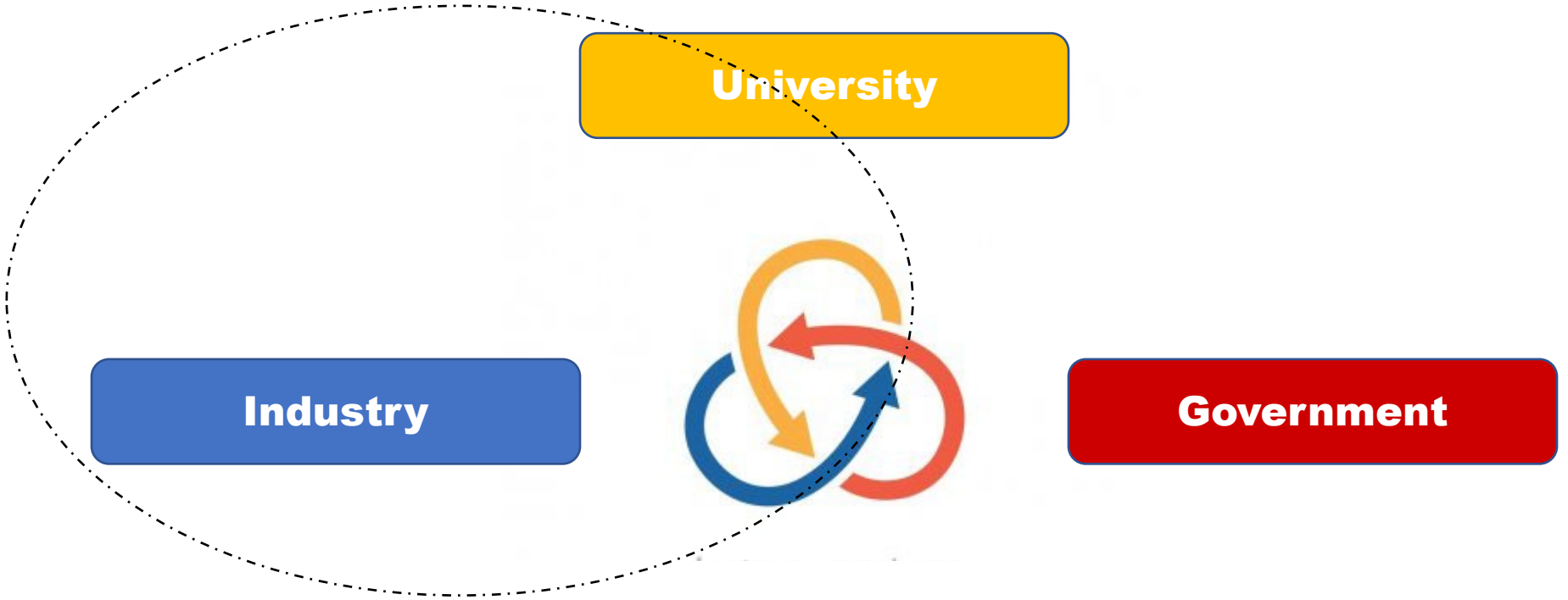
Where is Industry Located?

What makes a cluster successful?



Triple Helix Model of Innovation

How can we facilitate workforce transfer between Universities and Industry?



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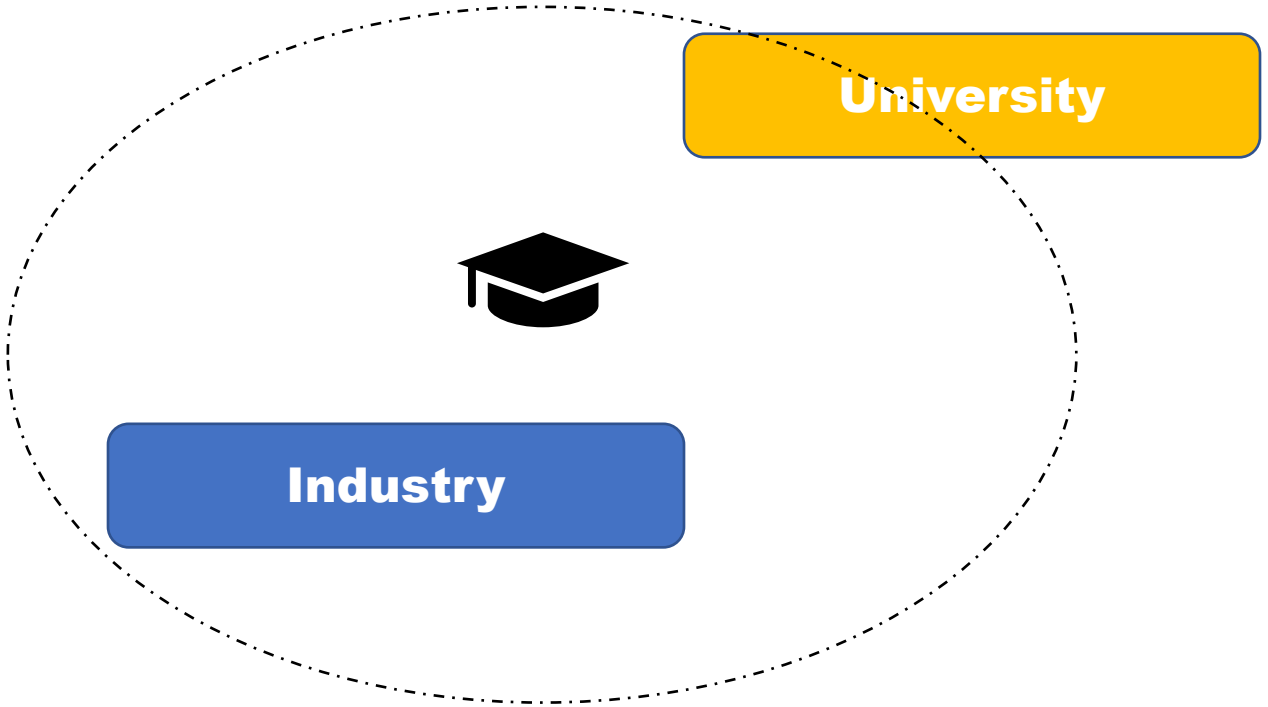

University Industry Collaboration

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University Industry Collaborations

University-Industry Collaboration (UIC)

"Universities-Industry collaboration (UIC) refers to the interaction between any parts of the higher educational system and industry aiming mainly to encourage knowledge and technology exchange."

(Bekkers & Bodas Freitas, 2008)

Universities-industry collaboration: A systematic review

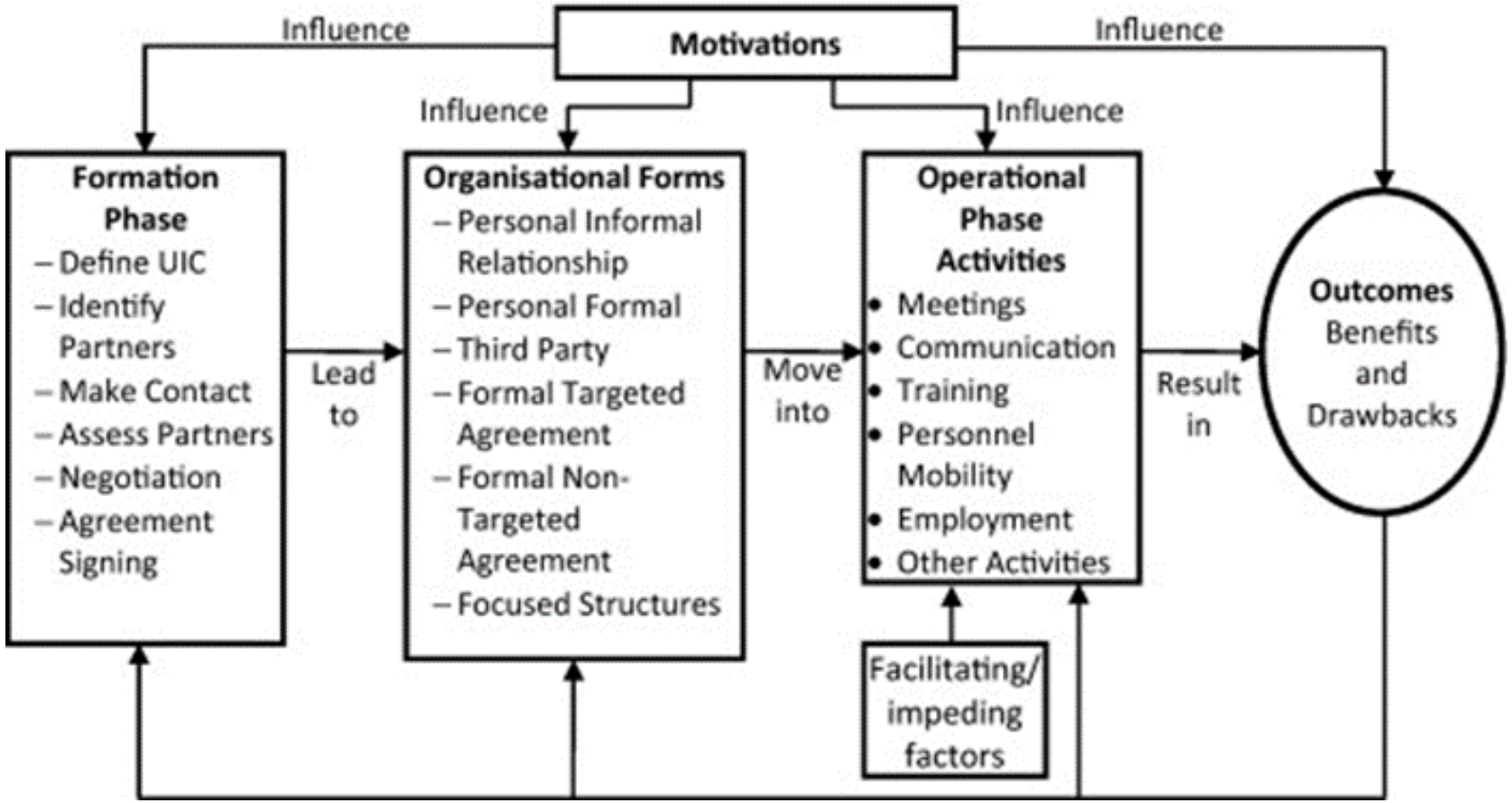
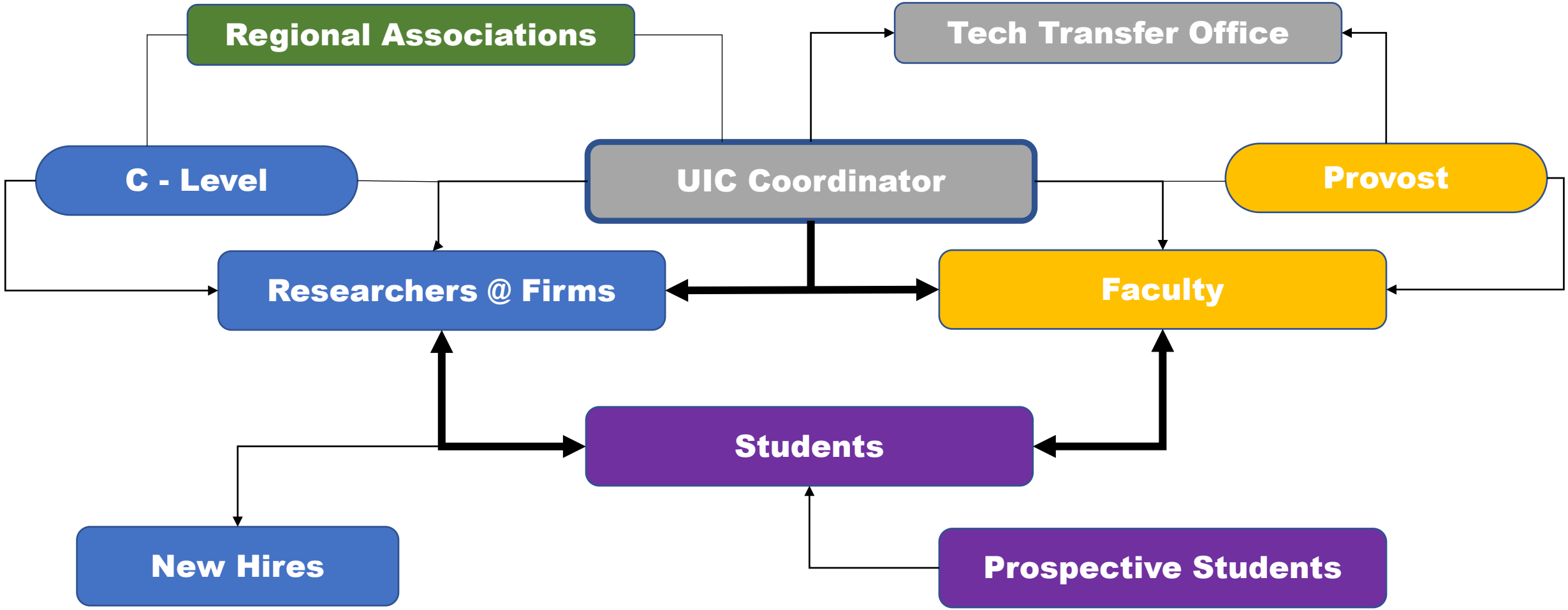
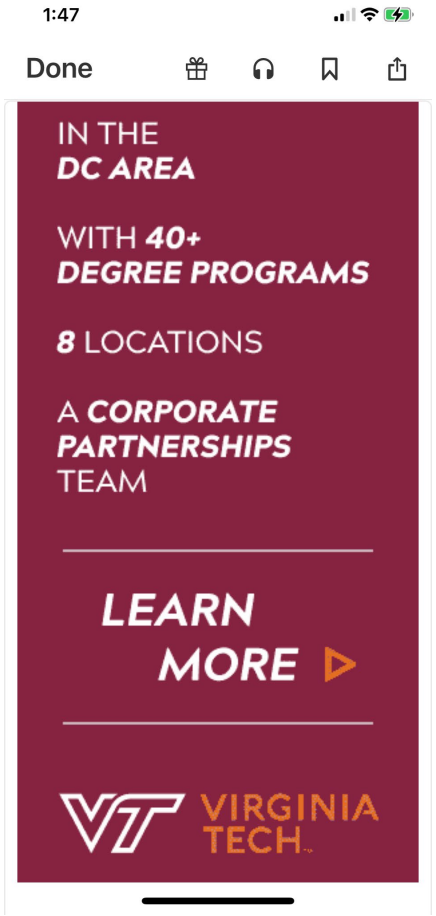


Chart Courtesy of Samuel Ankrah & Omar Al-Tabbaa, "Universities-Industry Collaboration: A Systematic Review." (2015)

UIC Participant Ecosystem



Why would UICs appeal to prospective graduate students?



Source: Virginia Tech (2022)

- Access to internships and practicum
- Job opportunities after graduation / Career advancement
- Collaborate in research that solves a real-world problem
- Collaborate with top researchers in both academia and industry
- Proof of existing partnerships in place for networking
- Resume builder / Demonstrates team skills

Why would UICs appeal to faculty?

Caltech

BOEING

University of CINCINNATI

P&G

moderna

Google

- Apply new technologies to real-world solutions
- Diversify their research portfolio
- Make their research more attractive to federally sponsored research
- Expand the network of potential collaborators
- Increasingly important for tenure promotion
- Research is attractive to graduate research assistants
- Start a new company

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UIC Initiative at American University

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- Private University in Washington DC (Northwest) - Small-Medium sized R2 Carnegie Class
- Elevated to R2: Doctoral Universities – High research activity
- (New!) Hall of Science
- Increased Federally Sponsored Research in STEM

FORMATION

- **Initiate '*STEM Outreach*' to industry**
- **Research and design a STEM Outreach effort for AY2021-2022**
- **Begin coordination with STEM GPDs: Bio/Biotech/Chem/Stat**

The goal is to **increase enrollment** by better aligning our STEM graduate programs to meet industry needs, and forge partnerships that will lead to knowledge and technology exchange.

These exchanges typically occur in the form of R&D collaborations with our faculty and graduate students.

REBRANDING

- **Literature review and research led to a rebrand: *'University Industry Collaborations'* (UIC)**
- **Propose quantifiable measures for UIC outcomes**
- **Reframe *STEM Outreach* into UIC model**

"Universities-Industry collaboration (UIC) refers to the interaction between any parts of the higher educational system and industry aiming mainly to encourage knowledge and technology exchange." (Bikers & Bodas Freitas, 2008)

UIC as a **catalyst** for innovation at AU by nurturing R&D Partnerships.

Project Objective | Reframing

Create partnership opportunities between CAS STEM graduate programs and industry

Increase Enrollment

Partnerships are for knowledge and technology exchange, usually in the form of an R&D collaboration

University-Industry Collaboration (UIC)

ALIGNMENT WITH AU PRIORITIES

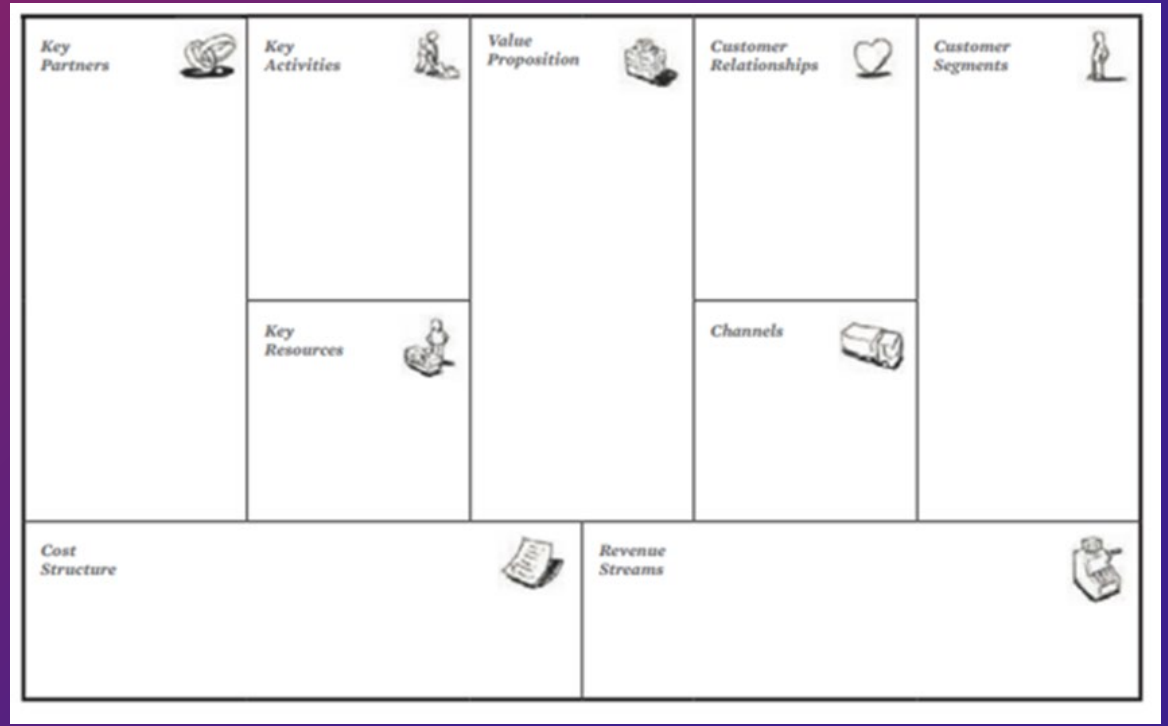
Strategic Plan 2025

- **Imperative #2: Research**
- **Imperative #8: Partnerships**
- **Imperative #7: Working with Washington**

Partnerships in R&D with industry can be an important component for AU's strategic goal of our research portfolio, while contributing to enrollment growth and student success.

Defining AU's Value Proposition and Alignment Methods

- First series of literature reviews focused on UIC collaboration
- Define our Value Proposition to the Customer
- Client-centric approach: What does the firm want? What are their Top-5 wishes?
- Use business management methods to align firms needs with STEM programs
- Adapted Business Model Canvas as an interview tool



Source: Osterwalder & Pigneur (2010)

FORMATION

- **Design and create a *Discovery Interview***
- **Define our value proposition to our customers**
- **Start with our neighbors: I-270 Technology Corridor**
- **Pilot Discovery Interview with a small firm with prior relationship**

Consulted with Faculty to develop a Discovery Interview based on the Business Canvas Model by Alexander Osterwalder & Yves Pigneur.

I-270 Corridor is a national life sciences cluster well aligned to our STEM programs

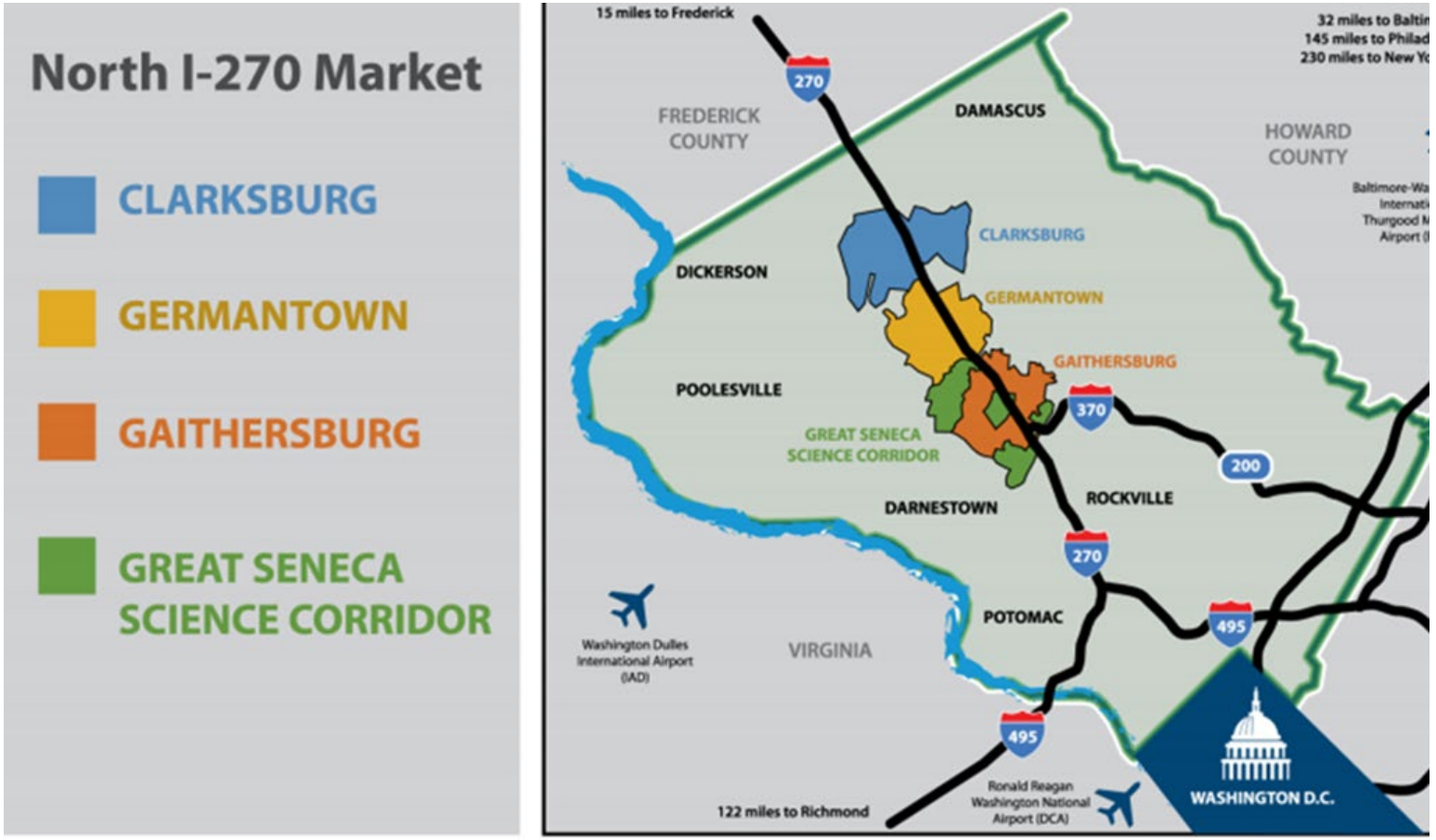
Piloted methodology and successfully executed our STEM outreach with Microprobes for Lifesciences (SBIR Phase II proposal)

Tapping into Biosciences/Lifesciences Community

North I-270 Technology Corridor

Gaithersburg - Germantown Chamber of Commerce

https://www.ggchamber.org/wp-content/uploads/2017/10/270N-Corridor-Tech-Report.pdf



Source Gaithersburg - Germantown Chamber of Commerce (2017)

Tapping into Biosciences/Lifesciences Community

Rank	Cluster	NIH Funding	VC Funding	Patents	Lab Space (SF)	Jobs	Total Score
1	Boston/Cambridge, MA	$1.055 Bil	$3.06 Bil	6,496	19.9 Mil	86,235	47
2	San Francisco Bay Area	$520.6 Mil	$2.20 Bil	10,312	19.3 Mil	67,738	43
3	New York-New Jersey	$787.3 Mil	$132 Mil	3,208	12.7 Mil	127,308	37
4	San Diego	$352.9 Mil	$650 Mil	4,383	11.9 Mil	63,730	33
5	Maryland/Virginia/ DC Metro	$420.7 Mil-4th	$146 Mil-6th	4,108-4th	9.5 Mil-5th	39,145-8th	28
6	Greater Philadelphia	$389 Mil	$125 Mil	1,365	6.4 Mil	53,614	22
7	Seattle	$374.4 Mil	$169 Mil	1,887	4.6 Mil	24,320	21
8	Los Angeles/Orange County	$337.4 Mil		1,479	2.0 Mil	120,688	18
9	Raleigh-Durham, NC	$349 Mil	$211 Mil	928		35,037	14
10	Chicagoland	$252.5 Mil	$69 Mil	1,143	3.5 Mil	53,054	12

Source Gaithersburg - Germantown Chamber of Commerce (2017)

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UIC Initiative at American University:

Faculty Research Mapping & Peer Competitors

FACULTY-FIRM RESEARCH

- **Collated and coded STEM Faculty research fields**
- **Collated and coded research fields of I-270 firms**
- **Compare faculty-firm research fields for alignment**

Cross-tabulation exercise prototyped a method to find viable opportunities in a research sector such as biotechnology and genome mapping in I-270 Technology Corridor.

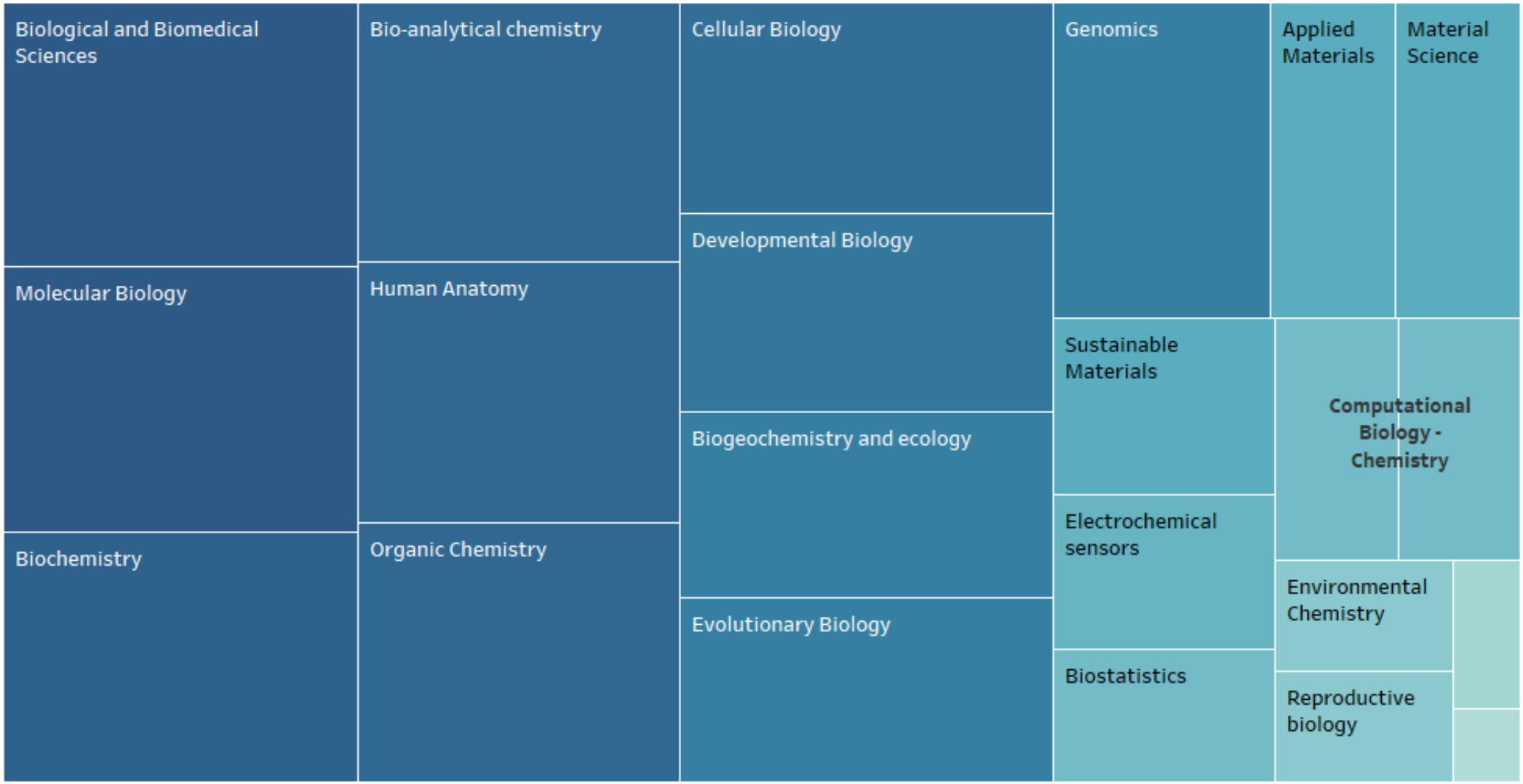


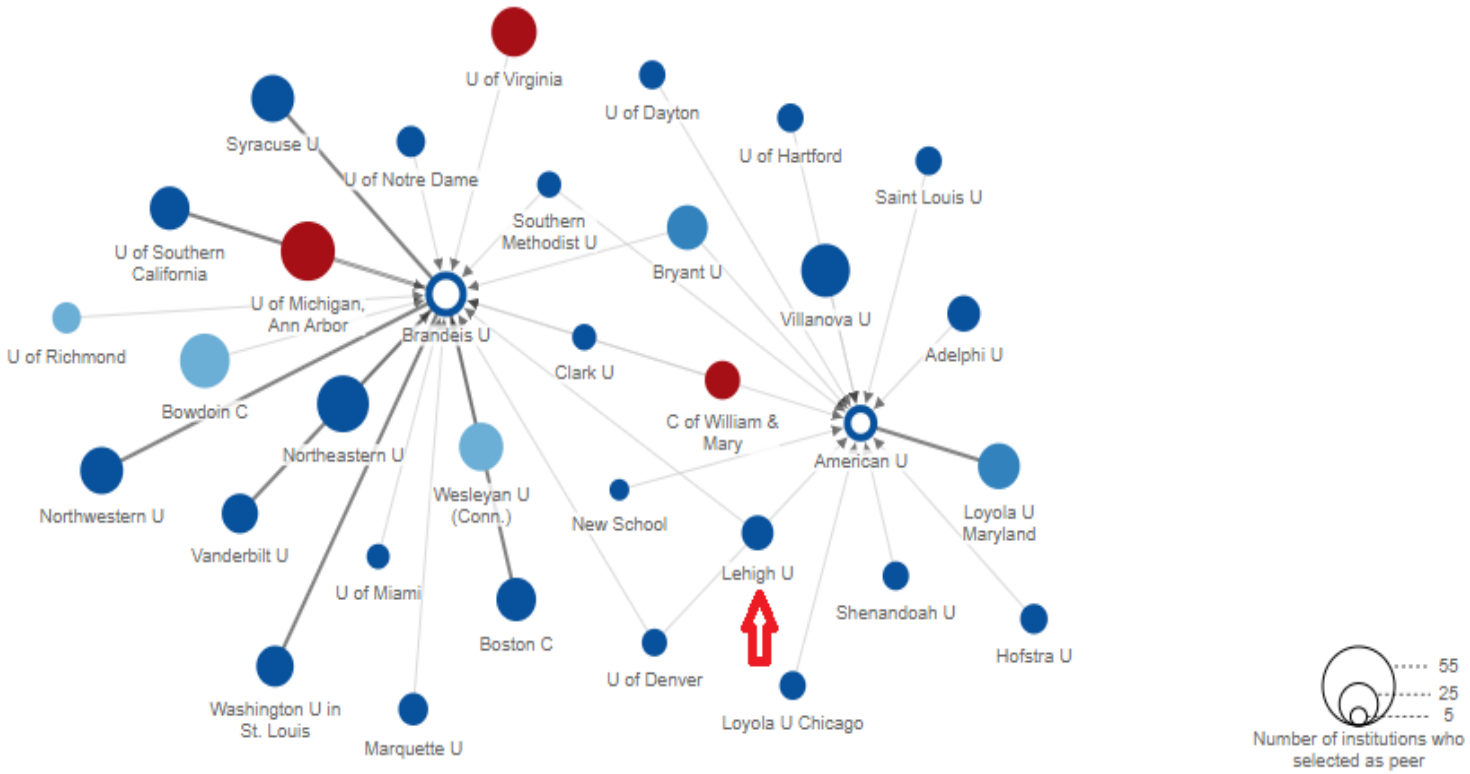
Figure: Tree-map of Crosstabulation of Faculty Research Area and Company's Main Science Field

S. Zovko and E. Yglesias, "University-Industry Collaborations (UIC) Initiative Final Report." (2022)

Peer Research

- Searched for Private Universities: Urban, Small to Medium size, with no Medical School, and a Carnegie Class R2 Institution
- Peer institutions were investigated online to determine UIC activities and organizational structure

Catholic University
DePaul University
University of Tulsa
Lehigh University
Fordham University
Brandeis University
Drexel University



American University x
Washington, DC | Private Doctoral

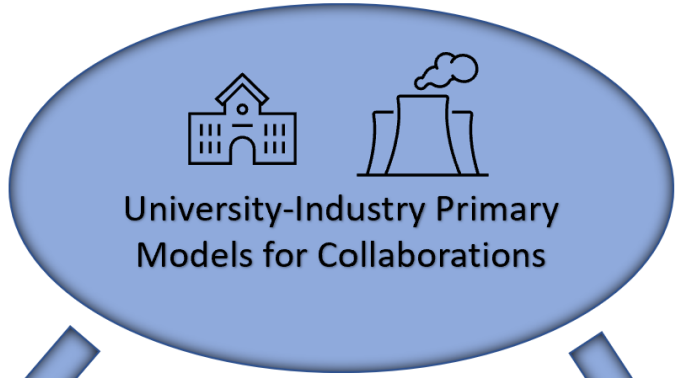
13 colleges selected as peers by this college. **14** colleges selected this college as a peer. **1** peer colleges that also chose this college as a peer.

Brandeis University x
Waltham, MA | Private Doctoral

26 colleges selected as peers by this college. **21** colleges selected this college as a peer. **6** peer colleges that also chose this college as a peer.

Source: Higher of Chronicle Education (2022), "Who Does Your College Think Its Peers Are?" https://www.chronicle.com/article/who-does-your-college-think-its-peers-are

Two Main Methods to form UICs at American University



Internships

- Addresses common challenges
  - Firms: Finding skilled workers
  - Universities: Giving students experience and placing in job market
- Can be paid or unpaid depending on market need and company

Grants

- Common examples include SBIR & STTR
- University professors collaborating directly with company scientists / staff
- Mutual gain of financial resources and advancing research

Source: S. Zovko and E. Yglesias, "University-Industry Collaborations (UIC) Initiative Final Report." (2022)

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UIC Initiative at American University:

Year 1 - Findings & Recommendations

- **Experts agree that enrollment is a byproduct of UIC outcomes**
- **UIC activities are scalable**

The literature and experts concur that UIC activities will increase AU enrollment in CAS STEM graduate programs.

While UIC activities can be very tailored to each firm, operations are scalable, and processes can be duplicated and optimized.

- **Contacting firms requires dedicated time and resources**
- **Proximity and timing matters**

Lead generation takes time and resources but, if sustained over time, it can produce actual collaborations.

Firms near AU are more likely to respond to initial reach outs and are more likely to collaborate.

- **Regional Economic Development Organizations and similar associations facilitate UIC development**

- **Follow-up with firms can be slow because faculty have competing priorities**

Third-party organizations can provide new leads, key contacts, and even facilitate grant development.

Faculty have a high workload, and multiple responsibilities to balance.

- **Data on UIC are largely unavailable**

- **Mass emailing is ineffective**

While quantitative data is not readily available, there is a rich body of anecdotal information - qualitative data.

Bulk contacting is not effective - contacting ***qualified leads*** produce the best results.

- **Discovery Interview protocol was successfully deployed**
- **UIC activities need better coordination at AU**

The instrument was developed early in the project based on expert input and the literature review.

Provost level management is needed to nurture UICs and serve as a catalyst for R&D collaboration with industry.

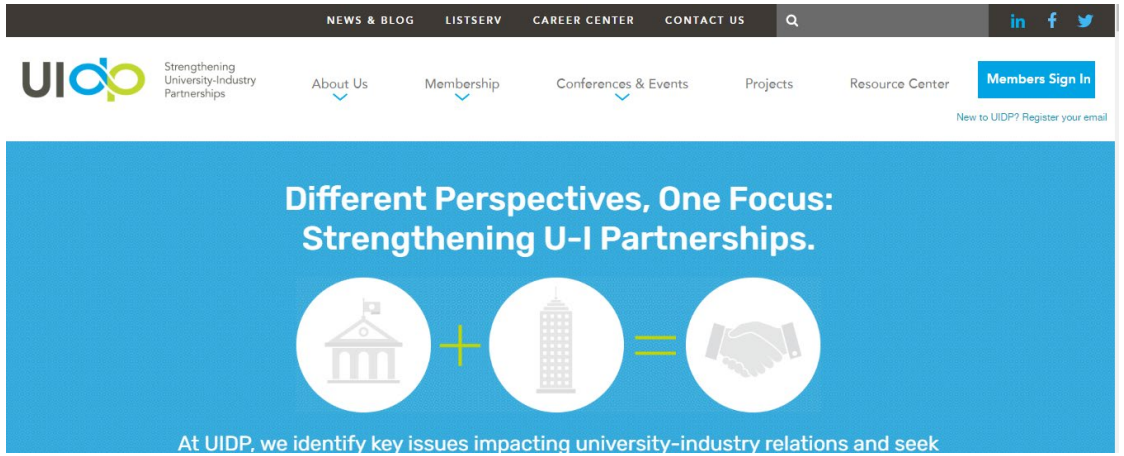
Apply for Federal Grants Designed to Promote UIC

NSF - Industry-University Cooperative Research Centers (IUCRC)

DOC - Economic Development Administration – STEM Talent Challenge

NIH - Academic-Industrial Partnerships for Translation of Technologies for Diagnosis and Treatment (R01)

Join National & Local UIC Associations



University Industry Demonstration Partnership (UIDP)

BioHealth Innovation

MARYLAND TECH COUNCIL

Local UIC Associations (i.e., BioHealth Innovation; Maryland Tech Council)

autm

Association of University Technology Managers (AUTM)

Bio

Biotechnology Innovation Organization (Bio)

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Regional Expansion AY2022-23

- Data Science
- Space Sciences
- Information Technology
- Cybersecurity

Discussion / Q&A

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Elmer Yglesias

Director of Data Analytics & Strategic Enrollment
American University

yglesias@american.edu

www.american.edu
www.american.edu/cas/research/uic/

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