Charting Your Path as an Assistant Professor

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Department of Atmospheric Sciences

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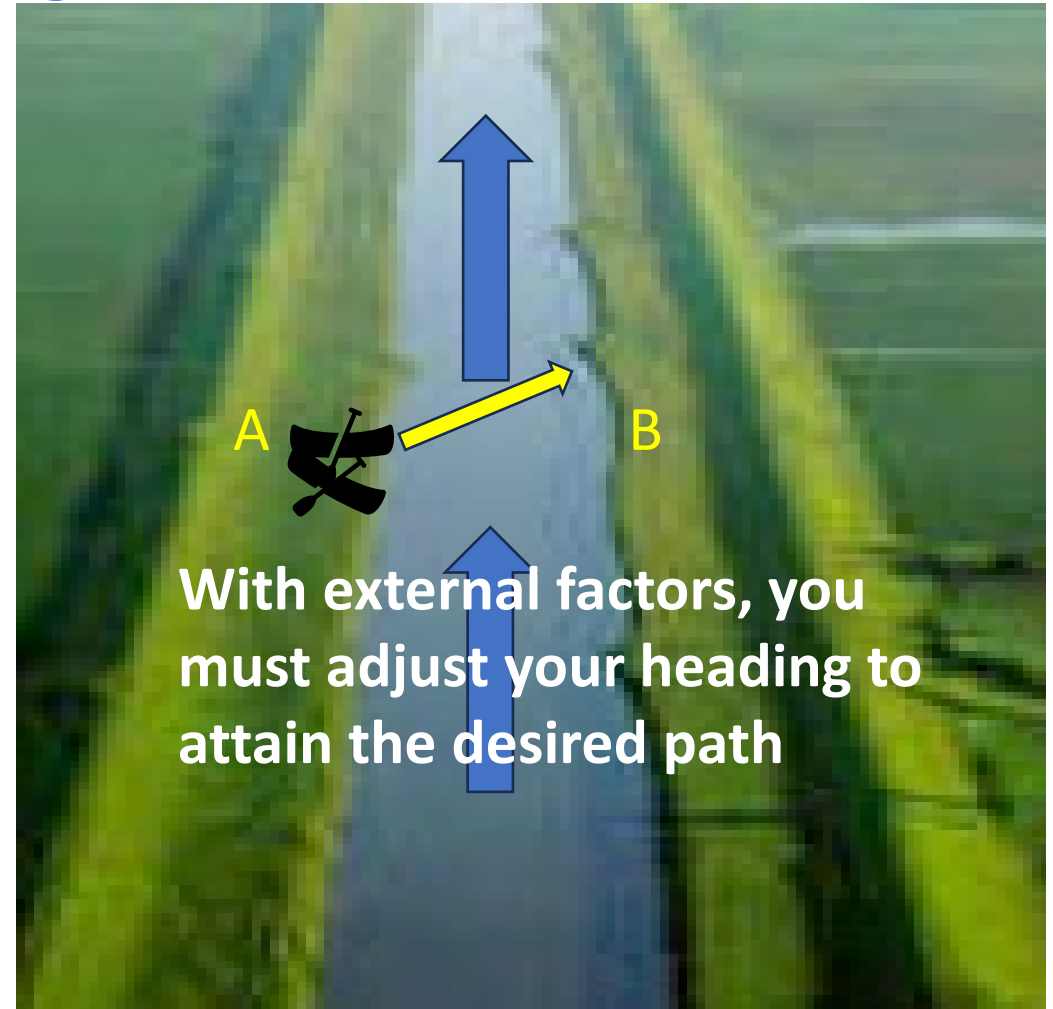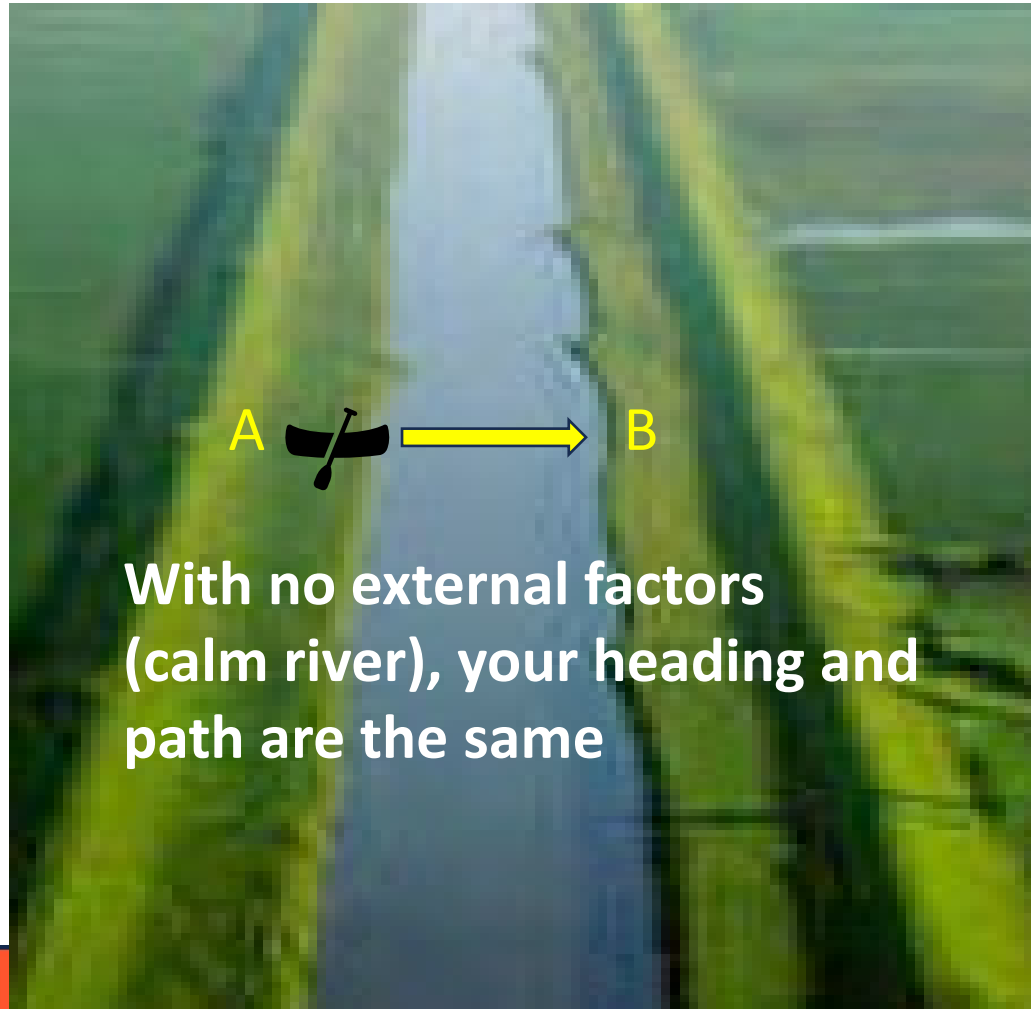**ILLINOIS**
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What Are You Charting?

- Charting your **HEADING** is relatively easy – it's where you are pointed!
- Charting your **COURSE/PATH** is much tougher – it's where you actually go given your surroundings!! And you need to continually make **CORRECTIONS**!

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What Are You Charting?

A → B

With no external factors (calm river), your heading and path are the same

A → B

With external factors, you must adjust your heading to attain the desired path

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Image Courtesy Illinois Extension

What You Need to Chart a Path

- Understanding of the "vehicle"
- Destination and way points
- Characteristics of the pathway
- Fuel and other resources needed
- Rest stops along the way
- Problems that might be encountered
- Alternate routes
- Consequences for failure to arrive

- Your abilities, needs and requirements
- P&T, grants, pubs, performances, exhibits
- Opportunities, roadblocks, false starts

Some of What Faculty Need

- Start-up funding
- Equipment
- Time
- Equipment maintenance
- Bridge funding
- Matching funds
- Book subvention funds
- Retention packages
- Graduate student funding
- Project management services
- Course development assistance

- Space
- Pre- and post-award support
- Career development support
- Proposal development support
- Compliance support
- IP/commercialization support
- Travel and publication funding
- Corporate partners
- Seed funding for career shifts/new ideas
- HR and IT services
- Research computing

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What You Need to Chart a Course

- Understanding of the "vehicle"

- Destination and way points

- Characteristics of the path

- Fuel and other resources needed

- Rest stops along the way

- Problems that might be encountered

- Alternate routes

- Consequences for failure to arrive

- Your abilities and needs

- T&P, grants, pubs, performances, exhibits

- Opportunities, roadblocks, known unknowns

- Work-life balance

- Declinations, budget cuts, facility shutdown

- New topics, collaborations, funding sources

- Depends on how one defines failure!

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Before Proceeding, What's On Your Mind?

- Excitement
- Anticipation
- Confusion
- Fear

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Do You See Yourself Doing the Following?

- Writing a grant proposal

- Reviewing a grant proposal, book, performance, or exhibit

- Protecting your scholarly intellectual property

- Meeting with a Member of Congress

- Testifying before Congress

- Addressing issues of bias in your work

- Encountering questionable or ethical conduct around you

- Having your scholarly work stolen or misappropriated

- Serving on a Federal agency advisory committee

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Do You See Yourself Doing the Following?

- Explaining to others how national research funding priorities are determined
- Helping determine those priorities
- Teaching your students about research ethics and misconduct
- Having to ensure that your work is reproducible
- Engaging the general public as partners in your scholarly work
- Managing a large group of scholars
- Developing collaborations with individuals in very different disciplines
- Learning about the complex world of research compliance
- Collaborating with scholars in other countries

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Do You See Yourself Doing the Following?

- Serving on a corporate board

- Serving as a private consultant

- Working with a private company

- Serving as a program officer in a Federal funding agency or private foundation

- Having to defend your work in the public sphere?

- Presenting your work to a general audience

- Having your work rejected (proposal, article, audition)

- Helping shape institutional or national policy

- Running for political office or doing a policy fellowship in DC

To What Extent Did Your Graduate and Post-Graduate Work Prepare You for These and Other Things?
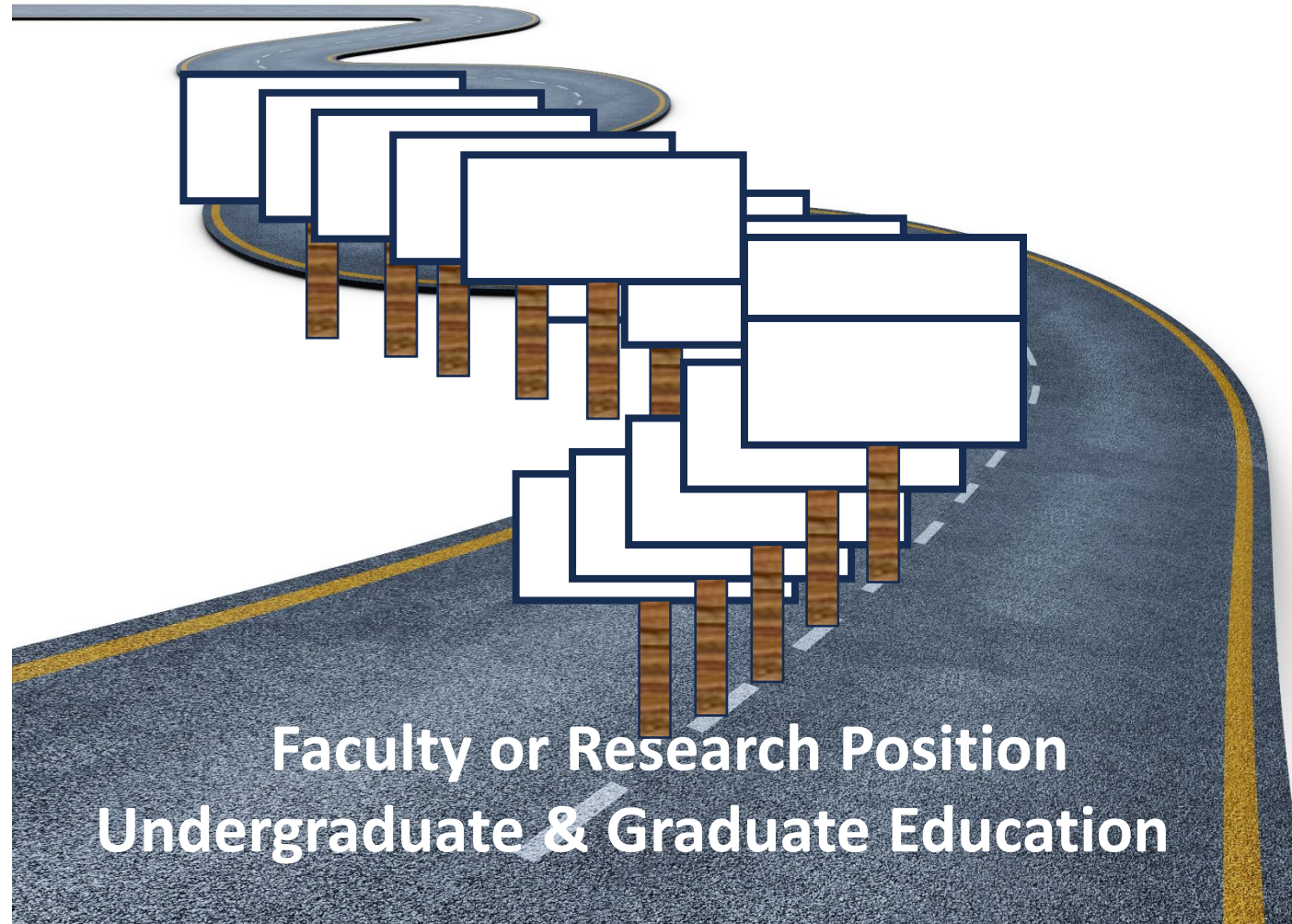
You Are an Expert in Your Area(s) of Scholarly Work – But What About All the Other Things You Need to Succeed?

And to Not Only <u>Participate</u> in the World of Research and Creative Activity, But Also <u>Shape</u> it for the Future
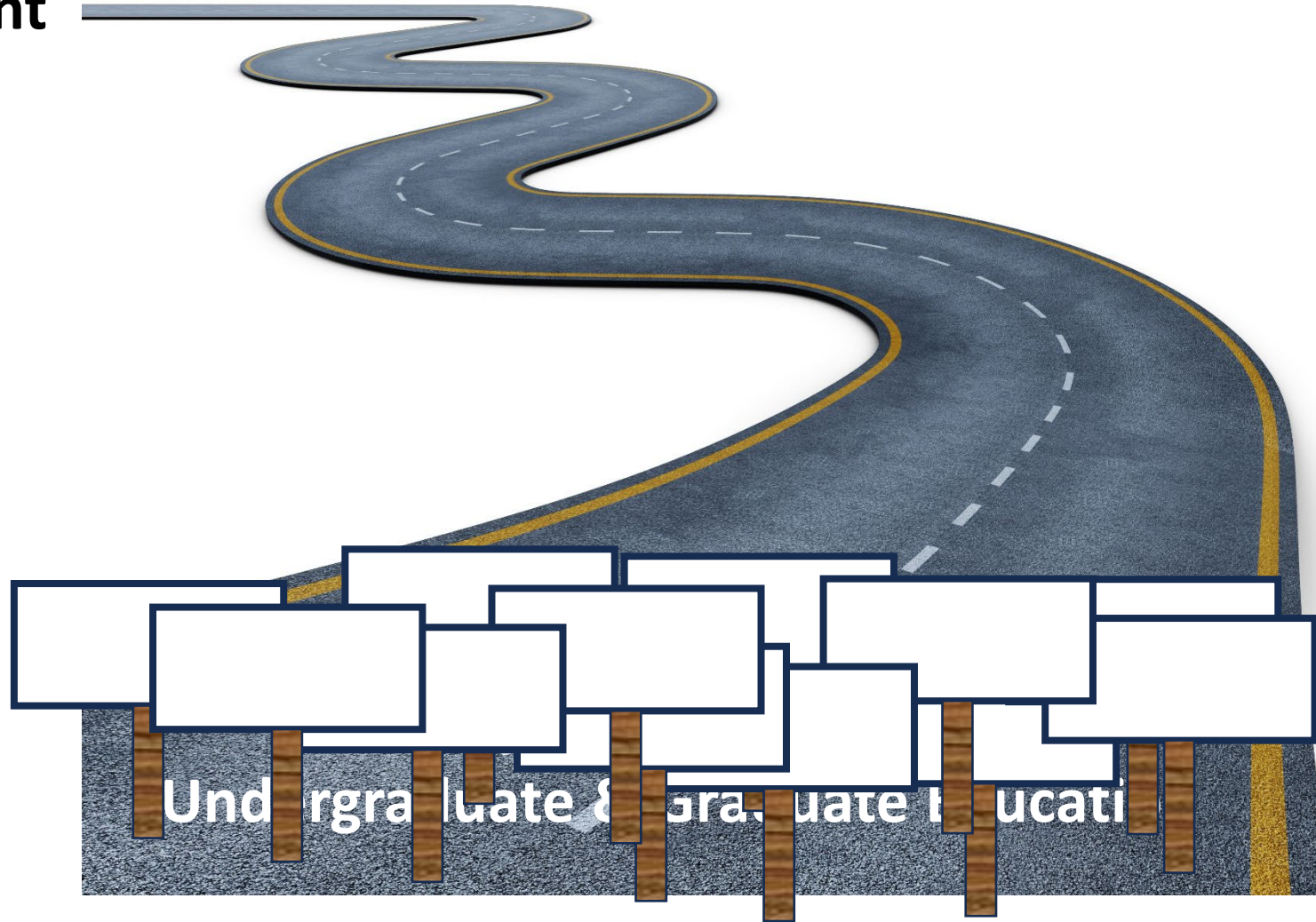
Retirement

Faculty or Research Position
Undergraduate & Graduate Education
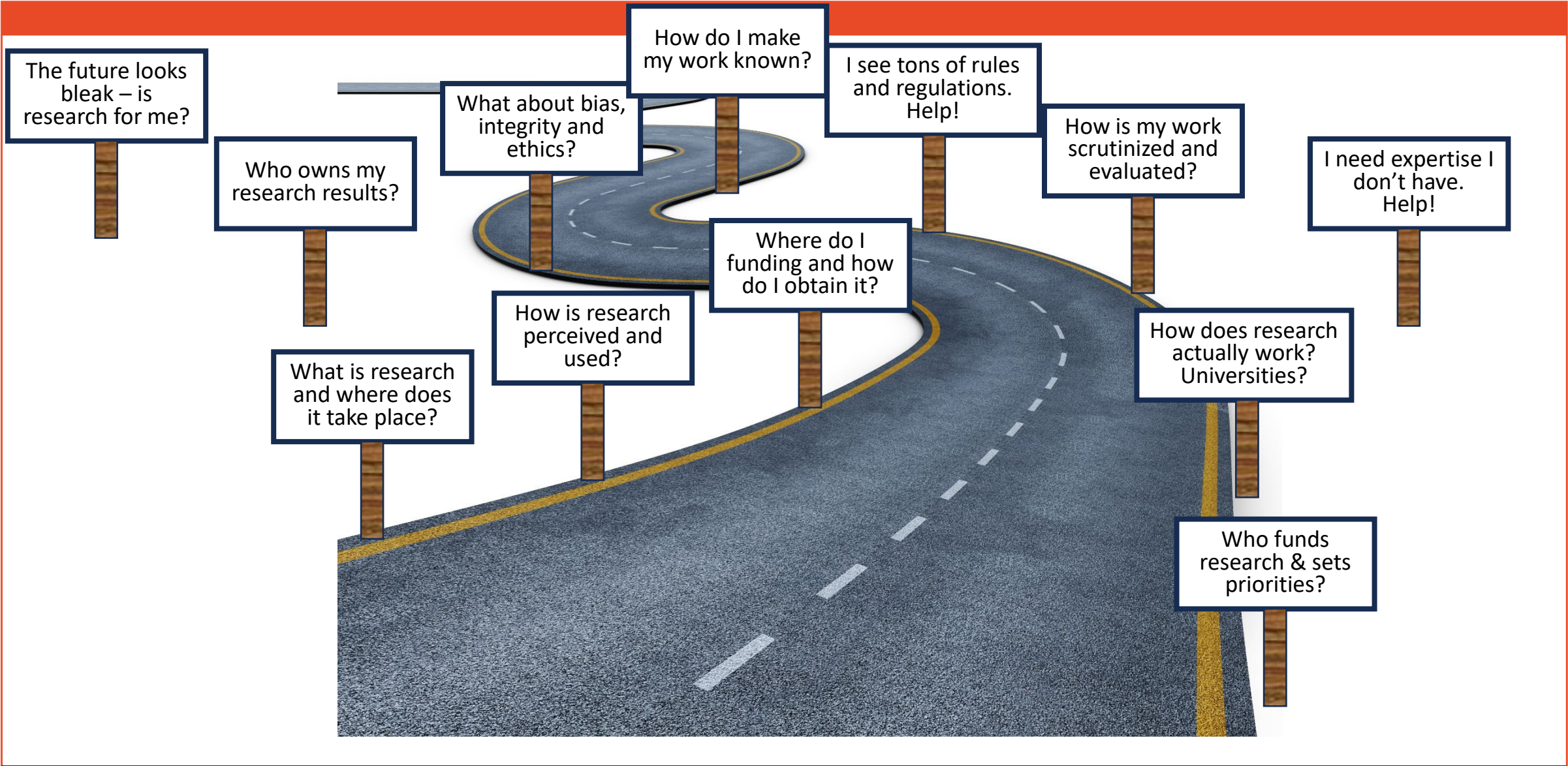
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Retirement

Undergraduate & Graduate Education

- A new resource for graduate and undergraduate students, post-docs and all faculty (especially early career)

- Published by MIT Press on December 19, 2023

- **Open Access – FREE!!**

- ALL DISCIPLINES – Art to Zoology!

- All types and sizes of institutions, especially MSIs, ERIs and PUIs

- Specific guidance for those at underserved & underresourced institutions

- Facilitator Guide

- For hardcopies purchased, all author royalties go to the U of I General Scholarship Fund

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Demystifying the **Academic Research Enterprise**

Becoming a Successful Scholar in a Complex and Competitive Environment

Kelvin K. Droegemeier

- **Not a how-to guide but an educational resource to give others benefits I didn't have**

- **Each chapter has...**
  - **Overview and learning objectives**
  - **Questions to assess comprehension**
  - **Deep-dive exercises**

- **Great resource for student and post-doc mentoring plans required by Federal funding agencies**

- **Can use it self-guided, as a course, or parts of it in existing courses**

- **Don't need to read it front to back**

Chapter Overview and Learning Objectives

As research and creative activity proceed and scholars give thought to disseminating the associated work products (chapter 11), they also must consider ownership rights and protections of those products, also known as intellectual property (IP). This chapter provides a foundation for understanding IP, the policies and laws governing its ownership, how it is protected, methods of disposition, and benefits accruing to the owner/inventor, his or her institution, and society more broadly. Additionally, it discusses challenges associated with IP in the context of multisector R&D partnerships. After reading this chapter, you should

- Be able to define and explain IP and the important role it plays in research and innovation;
- Explain federal policies and laws governing IP ownership;
- Differentiate among the various types of IP protection and know how to access and apply them;
- Understand how the academic enterprise supports researchers in IP commercialization and the various mechanisms available for the disposition of IP; and
- Be able to describe the value to society of IP.

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Chapter 1: **Deep in our Bones**: Why and Where We Perform Research and Creative Activity

Chapter 2: **The Money Trail**: Funding for Research and Creative Activity

Chapter 3: **Perception and Reality**: Public Attitudes, Understanding, and Use of Research

Chapter 4: **Essential Concepts**: Performing Research and Creative Activity

Chapter 5: **Becoming a Detective**: Finding What You Need and Using it Effectively

Chapter 6: **Diving into the Pool**: Research Proposals, Evaluation Processes, and Project Management

Chapter 7: **The Give and Take of Criticism**: Subjecting Research to Scrutiny via Peer/Merit Review

Chapter 8: **We See the World Differently**: Bias and Differing Views

Chapter 9: **Honesty is the Best Policy**: Ethical Conduct and Research Integrity

Chapter 10: **Better Safe than Sorry**: Research Compliance

Chapter 11: **Show Time**: Making Your Work Known to Multiple Audiences

Chapter 12: **Yours, Mine and Ours**: Ownership of Research Outcomes

Chapter 13: **I Need You and You Need Me**: Collaboration, Multidisciplinary Inquiry, and Academic-Corporate Partnerships

Chapter 14: **A Glass Half Empty or Half Full**: Challenges and Opportunities for the U.S. Academic Research Enterprise

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"This new book is a fantastic resource for helping next generation scholars gain a practical understanding of all facets of research and creative activity — knowledge that took me an entire career to acquire but which now is accessible to all in a single resource."

**—Jeff Kelly,
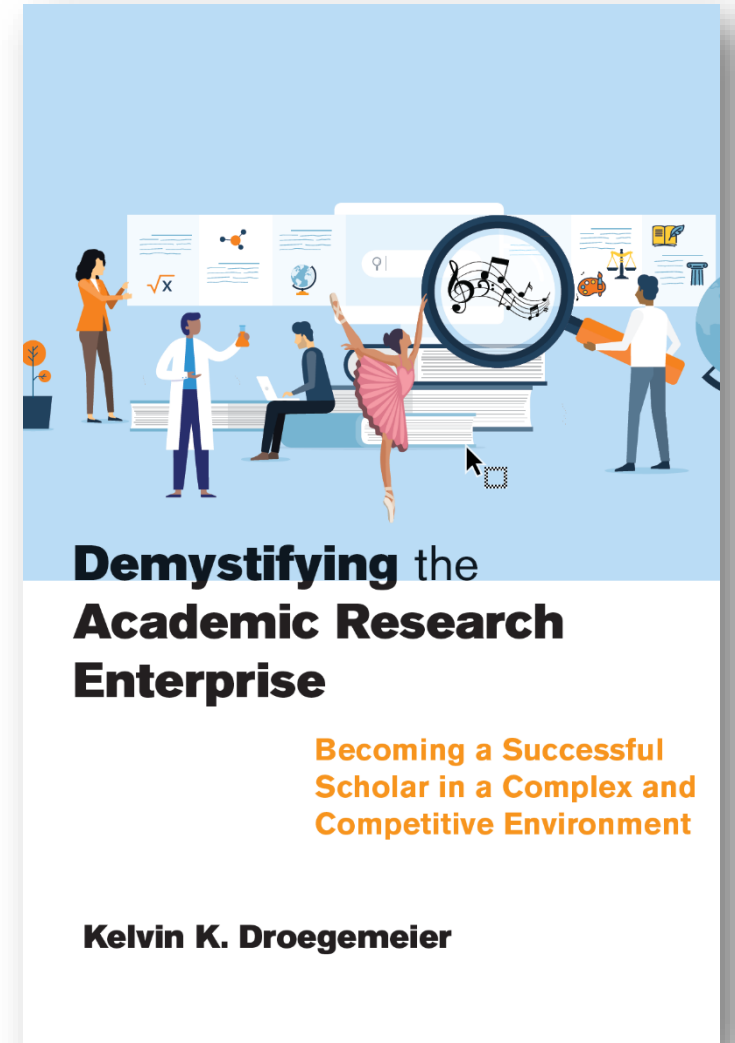Corix Chair in Environmental Sustainability and Professor of Biological Sciences, University of Oklahoma**

Don't Wait! Download the Final Page Proofs Now!

https://atmos.illinois.edu/sites/default/files/2023-09/Droegemeier%20Book.pdf

Book at MIT Press Website

Demystifying the **Academic Research Enterprise**

Becoming a Successful Scholar in a Complex and Competitive Environment

Kelvin K. Droegemeier

Foundations of Academic Research and Creative Activity

SPRING 2024

A unique new course designed for *all majors and disciplines*

Obtain a **CAREER'S WORTH** of knowledge about the history, structure and function of the academic research enterprise in a single course.

Undergraduate Students

Graduate Students

Post-Docs

Offered to all disciplines as ATMS 491

11:00 AM – 12:20 PM
Tuesdays + Thursdays

- Available for **all** academic disciplines

- No prerequisites

- No experience with academic research and creative activity is required

- Begin **mastering** important professional capabilities earlier than normal

- **Hands-on learning** to gain practical experience you can begin using right now

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Chapter 1: Deep in our Bones: Why and Where We Perform Research and Creative Activity
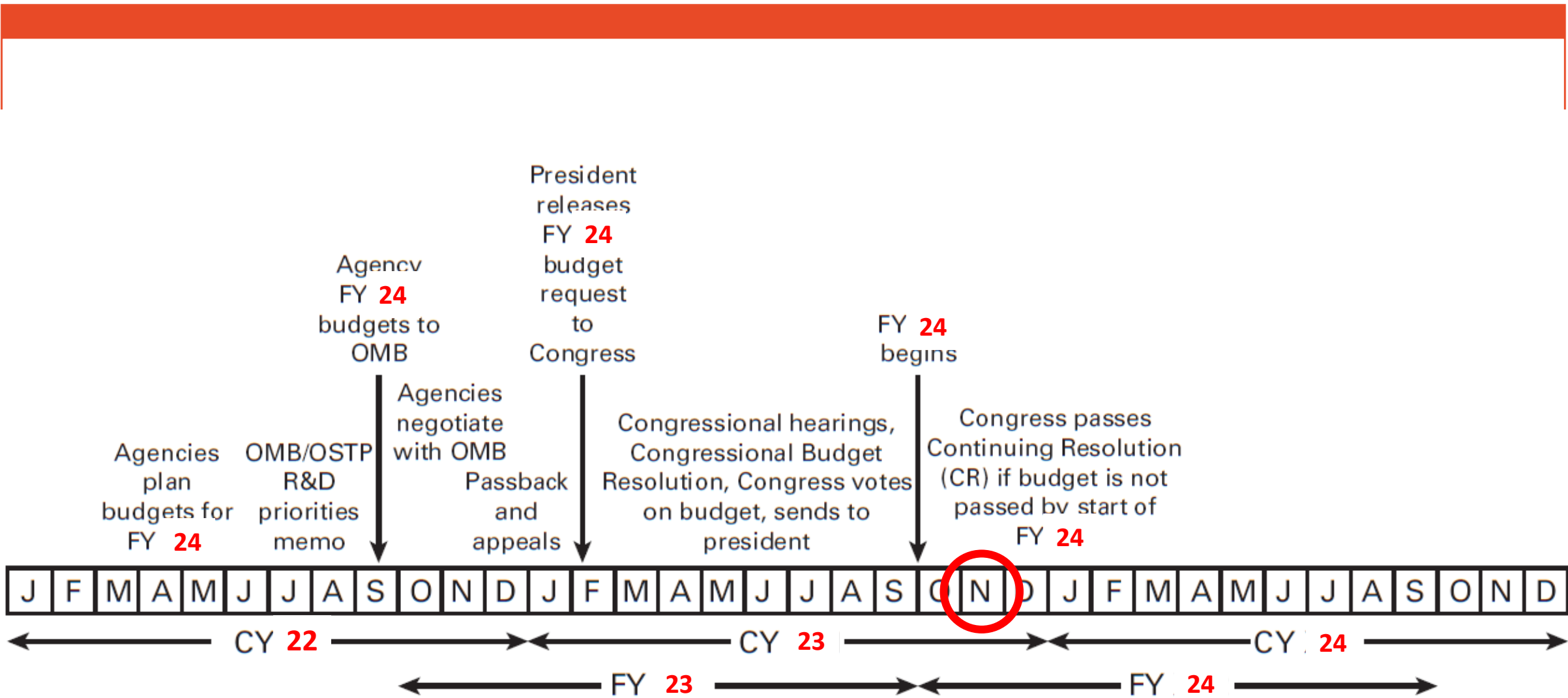
- Research <---> creative activity

- The spectrum of research

- Where research takes place

- Individuals, small teams, large centers

- Source of research funds

- Curiosity-driven vs use-inspired research

- Boundary-spanning problems

- University organizations that support your scholarly work

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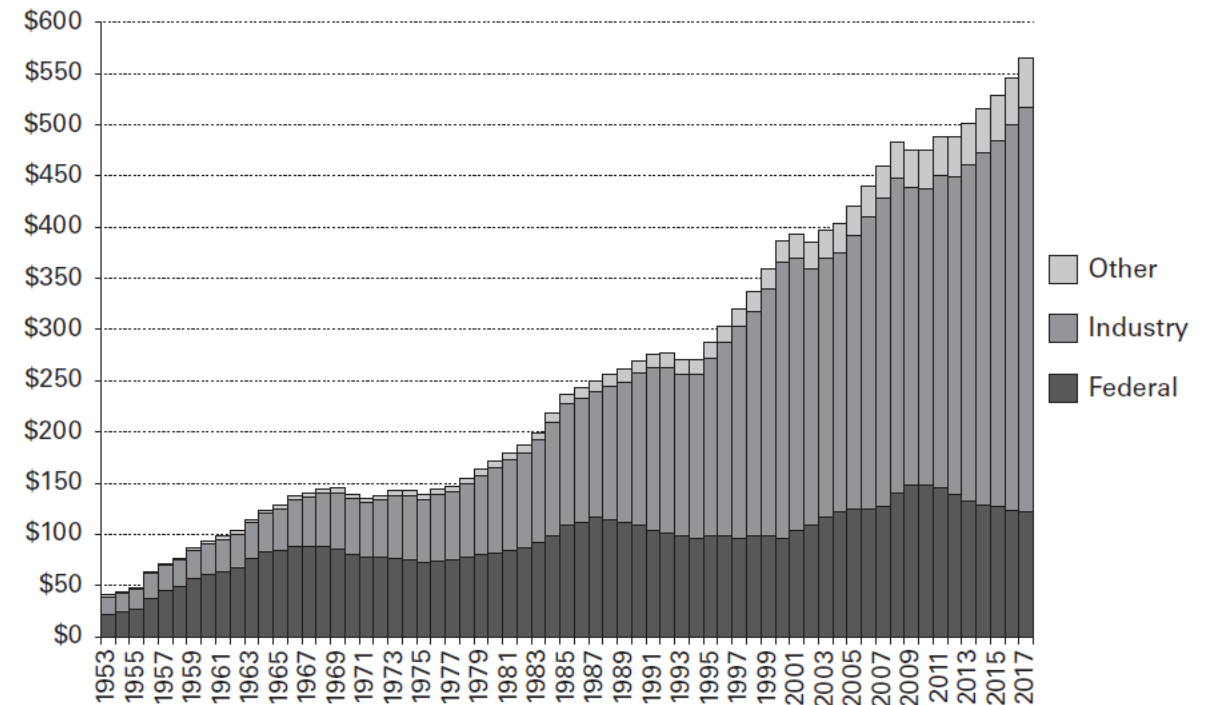
Chapter 2: **The Money Trail**: Funding for Research and Creative Activity

- Entities that fund scholarly work (26 Fed agencies)

- How research budgets are determined

- R&D planning in the Federal budget

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Agency FY 24 budgets to OMB

President releases FY 24 budget request to Congress

Agencies plan budgets for FY 24

OMB/OSTP R&D priorities memo

Agencies negotiate with OMB

Passback and appeals

Congressional hearings, Congressional Budget Resolution, Congress votes on budget, sends to president

FY 24 begins

Congress passes Continuing Resolution (CR) if budget is not passed by start of FY 24

J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

CY 22   CY 23   CY 24

FY 23   FY 24

Chapter 3: Perception and Reality: Public Attitudes, Understanding, and Use of Research

- Social compact with taxpayers

- Public attitudes

- Progress balanced with belief systems and ethics

- Use and misuse of research results in policy

- Roles of research and creative activity in society

Chapter 4: **Essential Concepts**: Performing Research and Creative Activity

Chapter 5: **Becoming a Detective**: Finding What You Need and Using it Effectively

Chapter 6: **Diving into the Pool**: Research Proposals, Evaluation Processes, and Project Management

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Replicability ←————————————————————→ Reproducibility

Access to and reproduction of the original results using identical or similar tools/methods

By the original researcher

By someone else with the identical tools

By someone else with similar tools

Access to and reproduction of the original results using completely different tools (e.g., stats, computational models)

Completely independent reproduction without access to original data and only based upon published information

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Facilities and Administrative (F&A) Costs (aka Overhead aka Indirect Costs)

- Grant funding (Federal agencies, private foundations, companies)
  - Direct costs
  - Indirect costs
- Shown at the right are items in the direct costs category

Item Description

Salaries and wages (principal investigator, coprincipal investigator, other senior personnel, postdoctoral researchers, technicians, and support staff)

Stipends for graduate and undergraduate students

Fringe benefits for all personnel

Materials, supplies, and services

Publication/dissemination costs

Equipment

Consulting services

Special computing services

Domestic and international travel

Special facilities utilization

Subcontracts

Participant support costs (e.g., subjects to be interviewed)

Facilities and administrative costs (F&A)

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Facilities and Administrative (F&A) Costs (aka Overhead aka Indirect Costs)

- Shown at the right are indirect costs, more properly termed facility and administrative (F&A) costs

- They are real costs borne by UIUC to support your research

- They are charged as a percentage of the direct costs (with a few caveats)

Category	Description
Facilities	Building depreciation: expenses associated with university-owned buildings, including the expense associated with federal contributions to those buildings.
	Equipment depreciation: expenses associated with university-owned capital equipment, including federal contributions to such equipment.
	Interest: interest associated with external debt financing of building acquisition and construction or renovation, less interest income earned on debt proceeds.
	Operations and maintenance: utilities, janitorial services, and ongoing repair and maintenance of university-owned and leased buildings.
	Library: operational costs of the university's library system excluding rare books but including staff.
Administration	General administration: payroll, executive and administrative offices, human resources, accounting, etc.
	Sponsored project administration: offices and personnel responsible for administering sponsored project activity.
	Departmental administration: administrative costs for each college and departmental or school.
	Student administration and services: costs associated with supporting students, such as the office of student affairs.

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Facilities and Administrative (F&A) Costs (aka Overhead aka Indirect Costs)

- The F&A "Rate" is set by the Federal government and is negotiated every few years

- UIUC's rate for sponsored research is 58%

- What does this mean? 58% of the budget is for something you don't get to spend??

Category	Description
Facilities	Building depreciation: expenses associated with university-owned buildings, including the expense associated with federal contributions to those buildings.
	Equipment depreciation: expenses associated with university-owned capital equipment, including federal contributions to such equipment.
	Interest: interest associated with external debt financing of building acquisition and construction or renovation, less interest income earned on debt proceeds.
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Facilities and Administrative (F&A) Costs (aka Overhead aka Indirect Costs)

- Suppose your total Direct Costs for an NEH proposal are $100,000

- The total budget is $100,000 x 0.58 + $100,000 = $158,000

- Here, F&A is roughly a third of the total budget

- **Now the confusing part…..**

- UIUC pays for the F&A in your grant when it's awarded, and then is REIMBURSED by the Federal government

- This reimbursement can be used for anything – especially the laundry list of faculty needs noted earlier (e.g., start-up, seed funding, matching funds, etc)

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Facilities and Administrative (F&A) Costs (aka Overhead aka Indirect Costs)

- Why all this gory detail????
- Faculty tend to think F&A is unnecessary or a slush fund
- Private companies often don't understand it – they see it as profit. Plus, the terms "overhead" and "indirect costs" have very different meaning in their world
- Most in Congress REALLY don't understand F&A and want to reduce or eliminate it
- It's true that higher F&A rates mean less direct money for research
- It's also true that without F&A, universities could not support their faculty

Facilities and Administrative (F&A) Costs (aka Overhead aka Indirect Costs)

- And here's the REAL rub!!

- Many Federal agencies do not allow universities to use their FEDERALLY NEGOTIATED F&A rate!! They limit it to something like 25 or 30% - capriciously

- Across all academic research institutions, this amounts to about $5B of underrecovered funding each year!!

- To make matters worse, the "A" component of the F&A rate (recall the two parts of the table) has been capped at 26% since 1991 – despite a HUGE number of additional compliance requirements placed on universities

- This is NOT THE CASE for private industry grant recipients!

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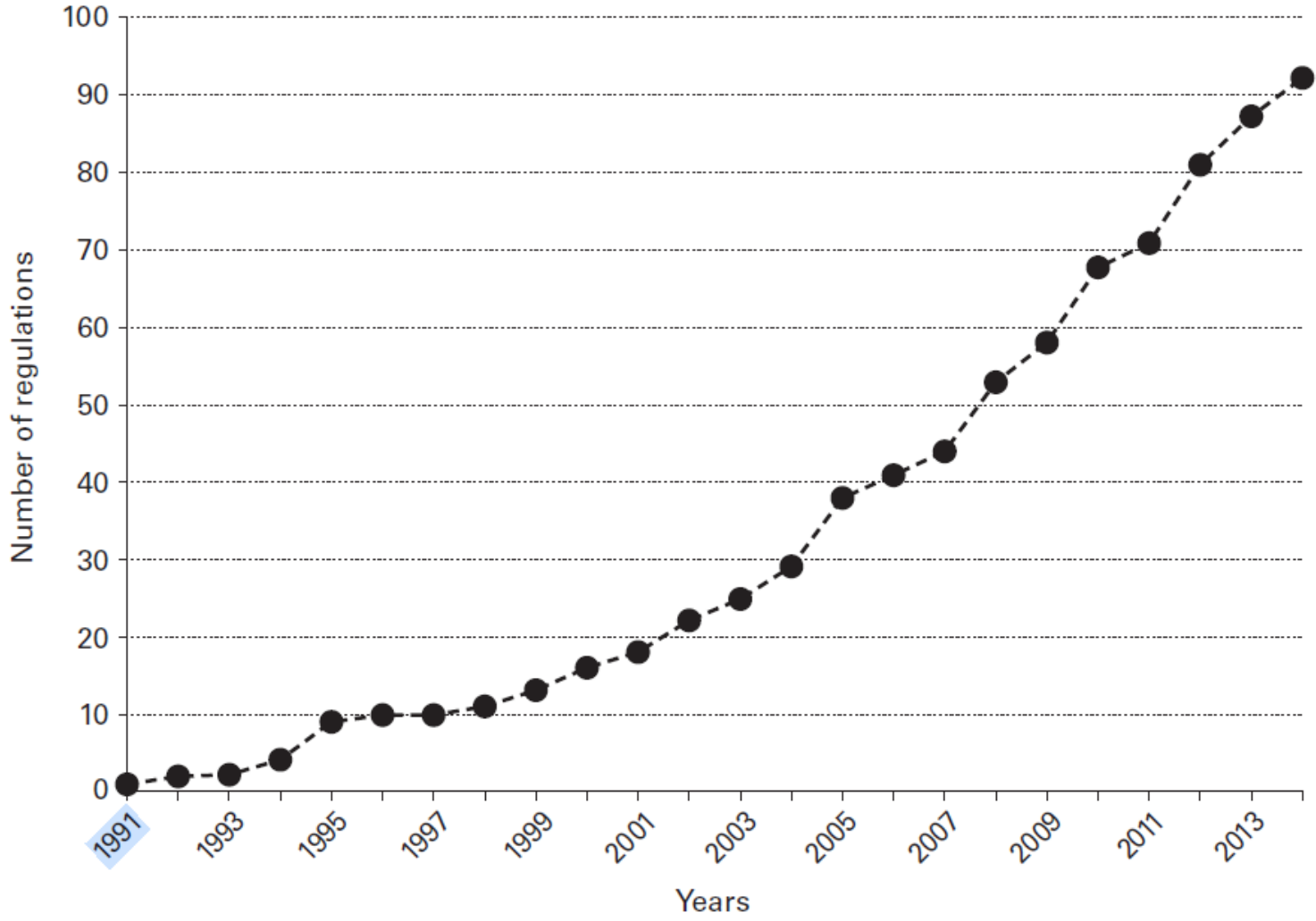
Moral to the Story:
Understand F&A and Know that Without It, You Would be Unable to Do What You Came Here to Do!!

Faculty Administrative Workload on Federal Grants is – HUGE!
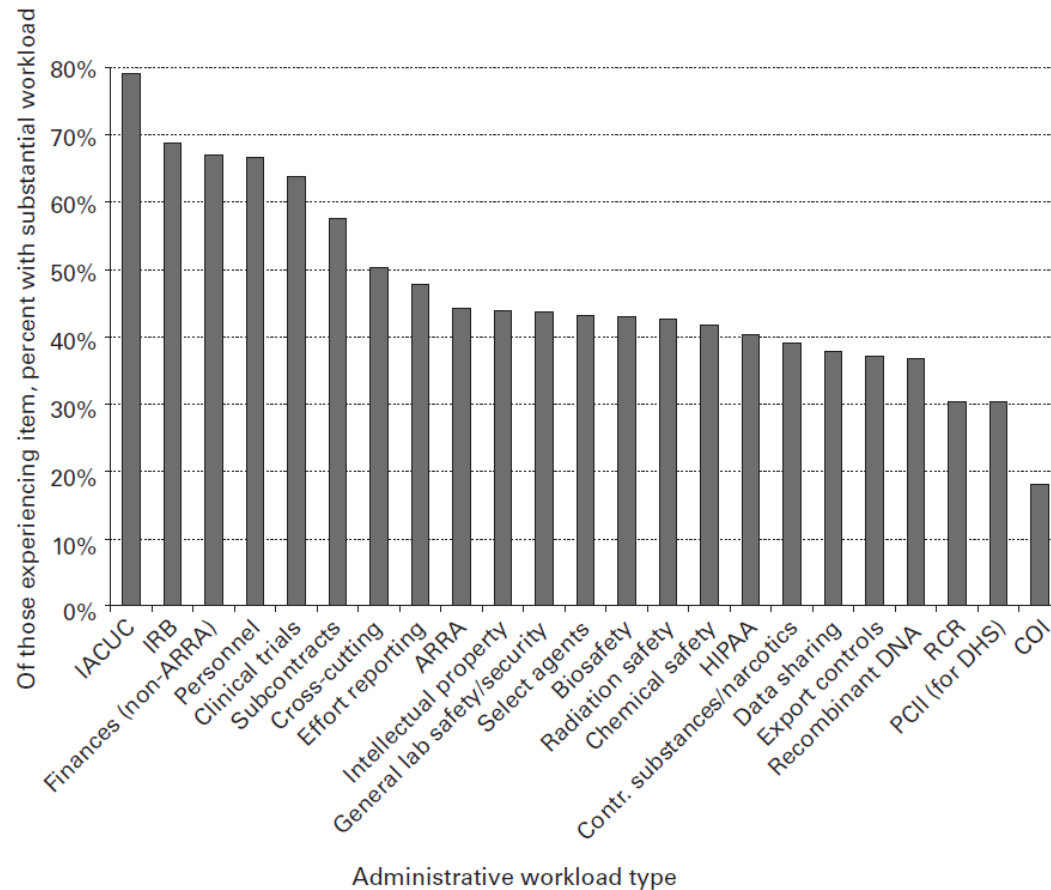
On average, faculty in U.S. universities spend between 42% and 44% of their time on administrative activities associated with Federal grants unrelated to the research itself

Chapter 8: We See the World Differently: Bias and Differing Views

- We all have biases! Some good, some bad!

- Bias and discrimination – similar but different, good and bad

- Bias can determine behavior – and that's when we become aware of it

- Numerous types of bias exist, both conscious and unconscious

- Shows up in reviews of our work and proposals, evaluations, applications, publishers

- Great deal of scholarly work being done to better understand and mitigate it

- Views of research differ widely

  - COVID Pandemic

  - Golden Fleece Awards, Federal Fumbles, etc.

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Chapter 9: Honesty is the Best Policy: Ethical Conduct and Research Integrity

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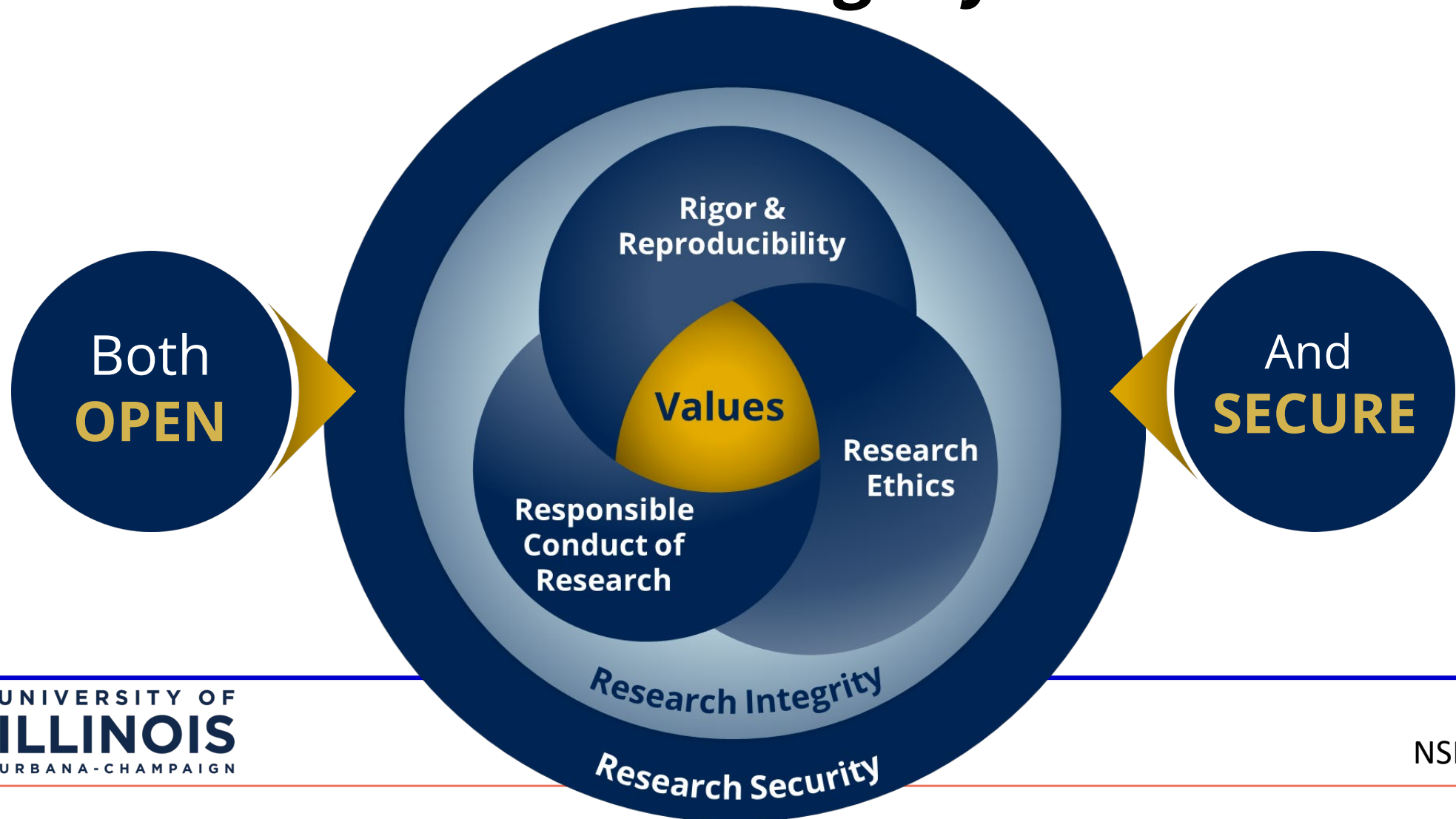
Chapter 10: Better Safe than Sorry: Research Compliance

- And you thought the real universe was big and complex!!

- Goal is to the know rules, how to follow them, and consequences for not!

- UIUC has amazing resources to help you!

- Numerous types of research compliance

- Human and animal subjects, toxic agents, reporting, conflicts of interest and commitment, data management, open access, RESEARCH SECURITY, etc.

- BE A DRIVER OF CHANGE!!! Many organizations assist (AAU, APLU, COGR)

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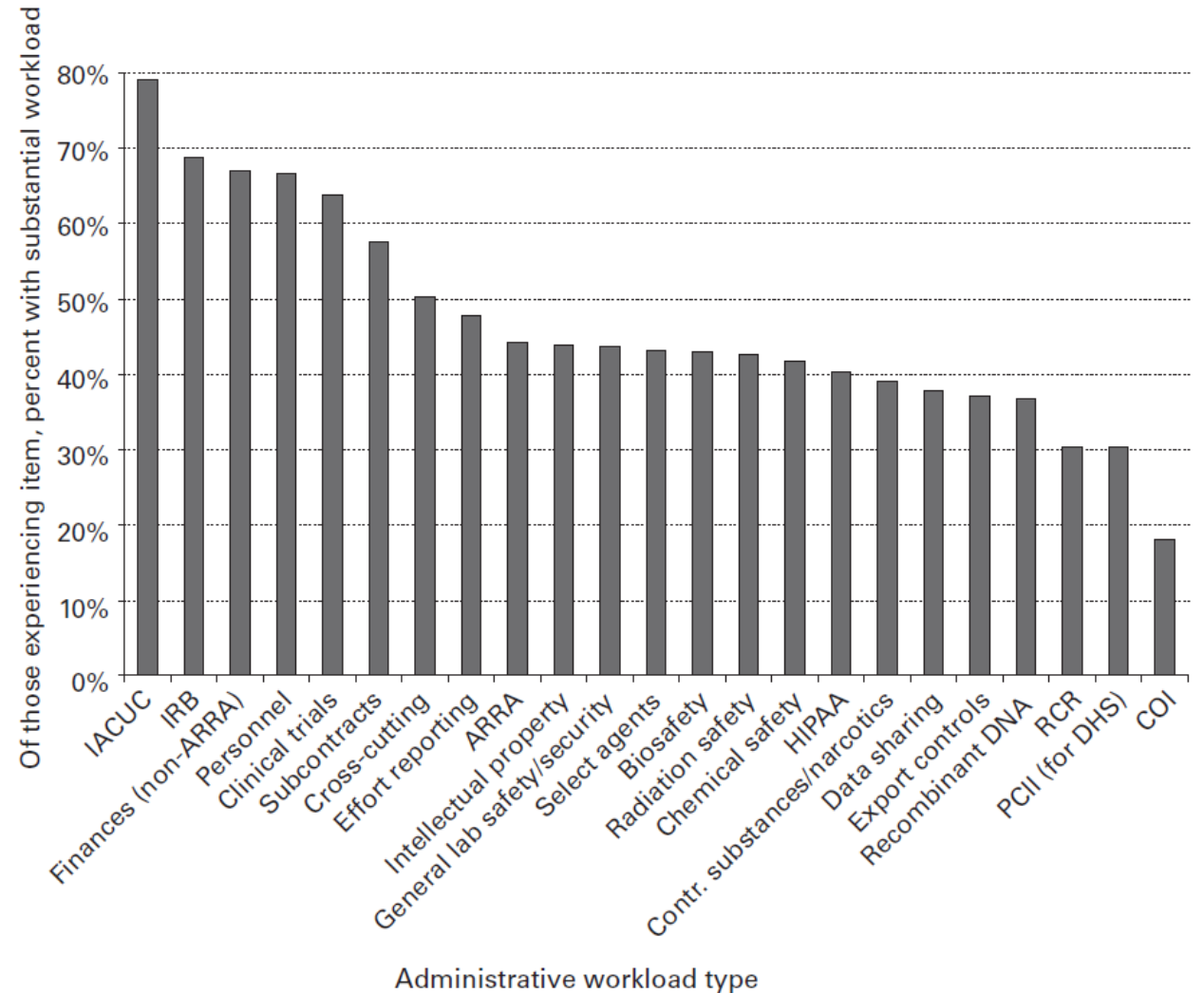
Chapter 11: Show Time: Making Your Work Known to Multiple Audiences

- Research and creative activity are about the generation AND dissemination of new knowledge

- Communicating WITH both expert and non-expert audiences is key

- Learning this early is VERY important

- New modes of communication – OPEN AND PUBLIC ACCESS, OPEN SCHOLARSHIP
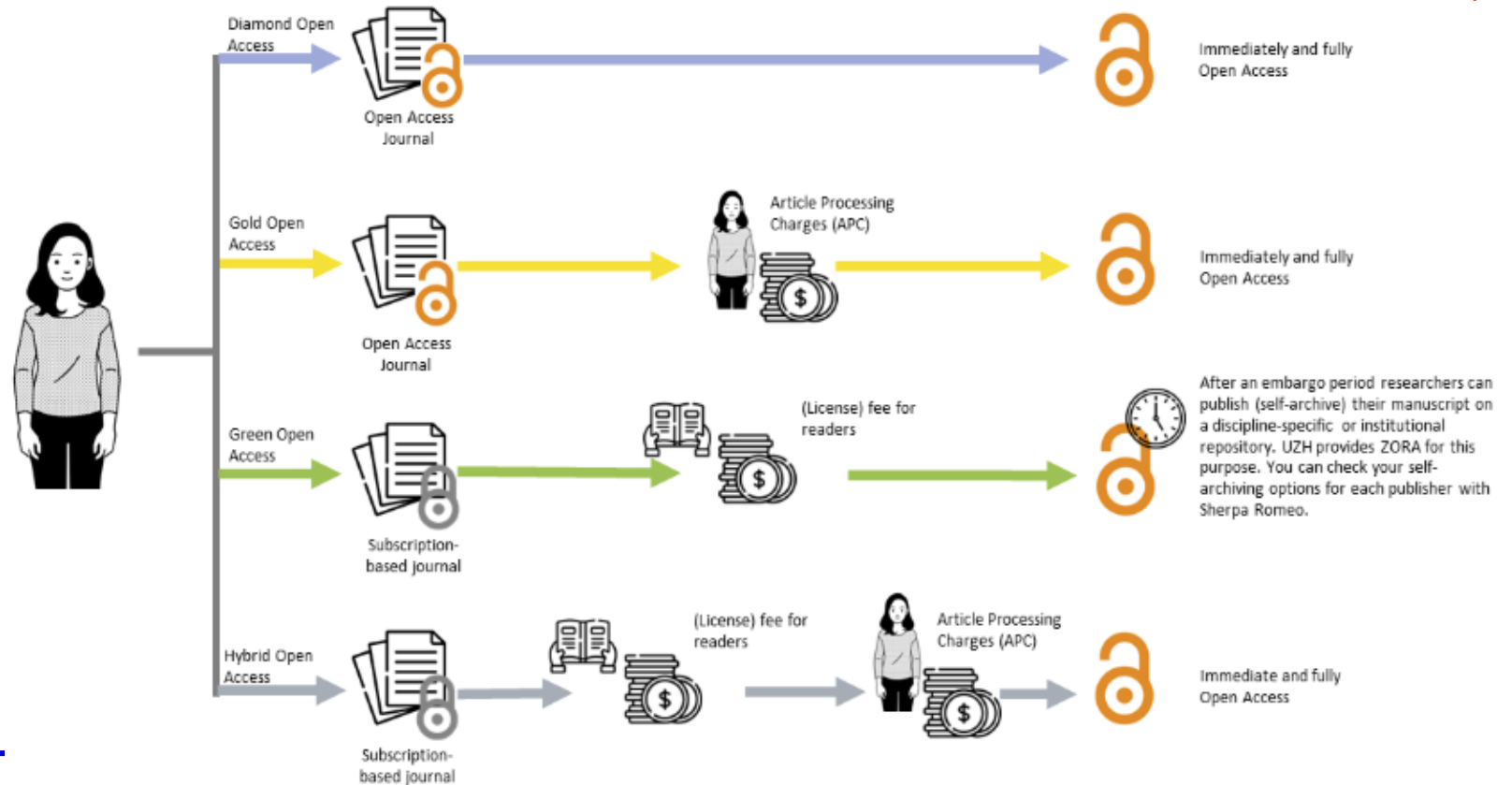
Chapter 12: **Yours, Mine and Ours**: Ownership of Research Outcomes

- Super important topic in all disciplines!!

- Many in the arts and fine arts fall prey to unscrupulous agents

- Need to know this before it's too late!

- What is intellectual property (IP) and how is it protected?

INTELLECTUAL **PROPERTY RIGHTS**

THAT **HAVE TO BE APPLIED FOR** ✏

THAT **AUTOMATICALLY ARISE**

PATENT RIGHTS

DESIGN RIGHTS

CHIP RIGHTS

COPYRIGHT

TRADE NAME RIGHTS

TRADEMARK RIGHTS

PLANT BREEDER'S RIGHTS

DATABASE RIGHTS

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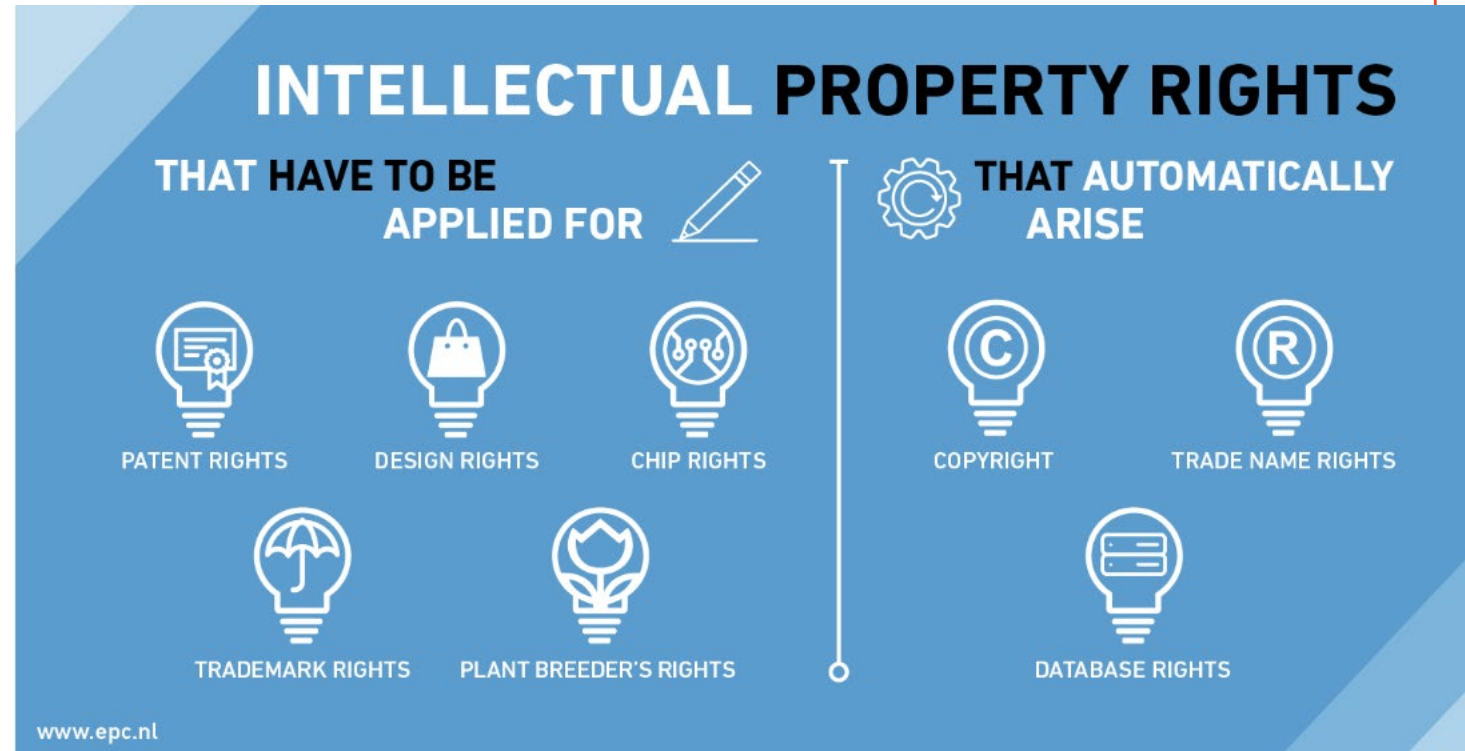
Boundary-Spanning Problems

Physical, Natural and Life Sciences

Humanities

Technology and Engineering

Policy

Social, Behavioral and Economic Sciences
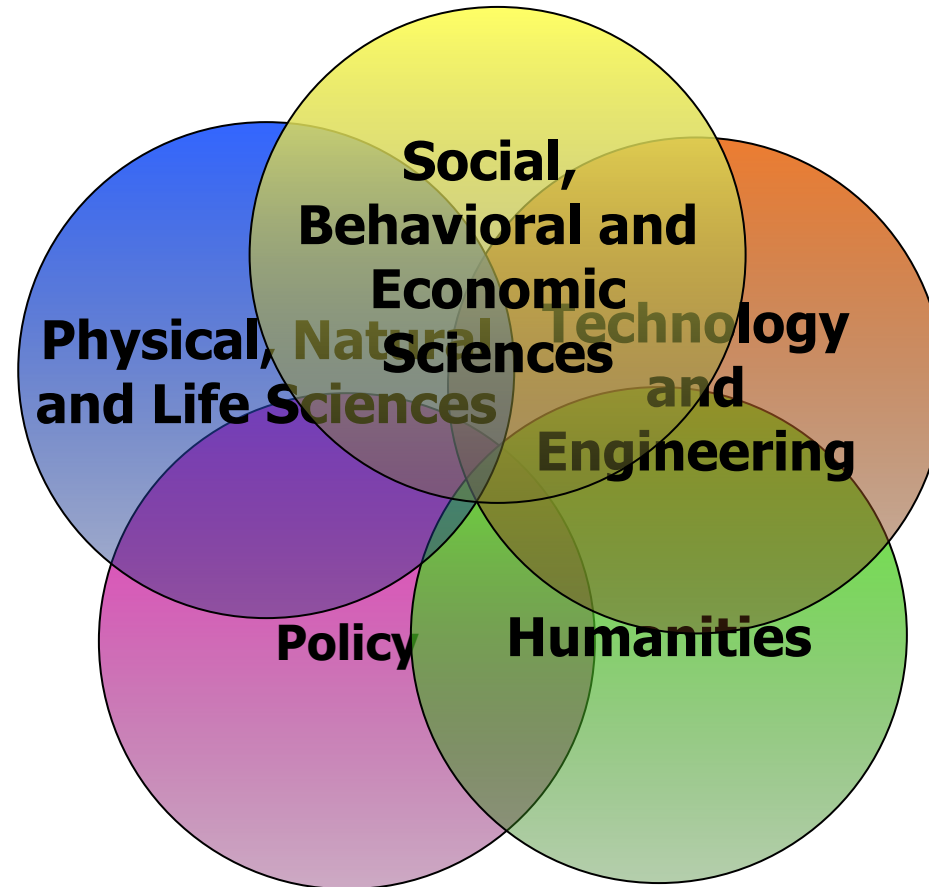
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Boundary-Spanning Problems

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Chapter 13: I Need You and You Need Me: Collaboration, Multidisciplinary Inquiry, and Academic-Corporate Partnerships

- Uni-Disciplinary

- Multi-Disciplinary

- Interdisciplinary

- Transdisciplinary
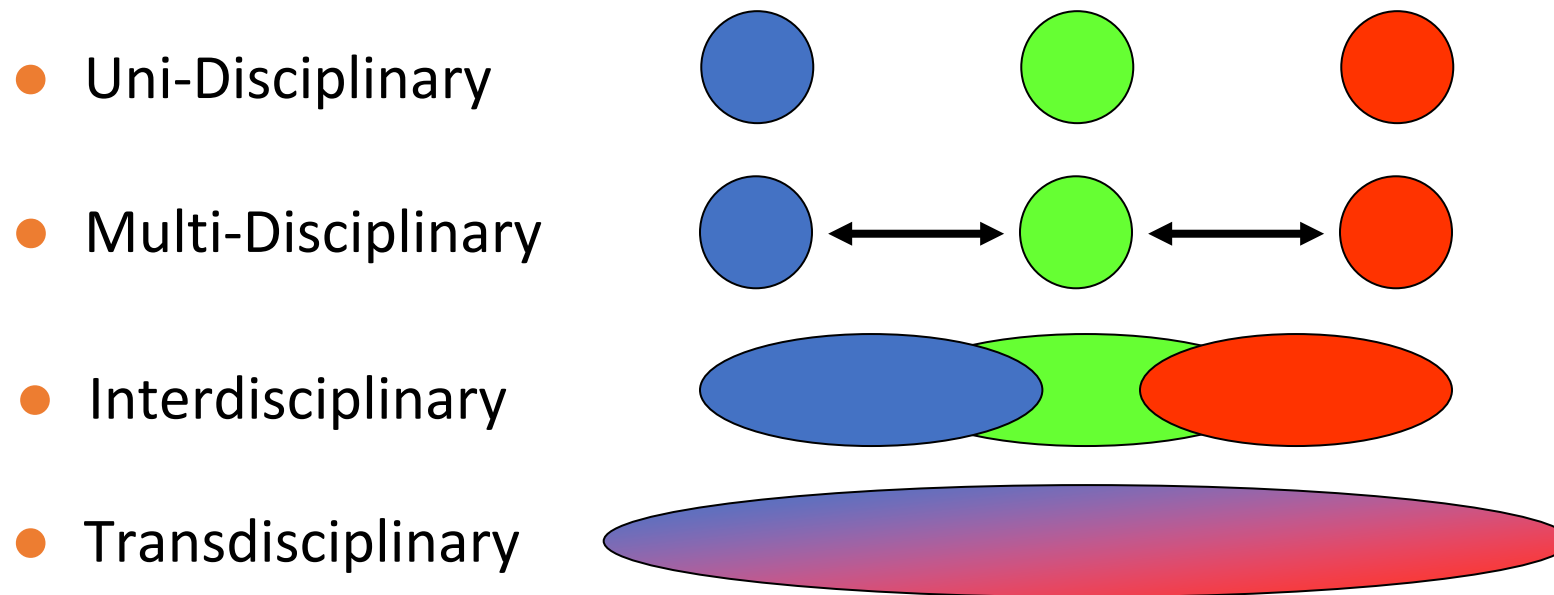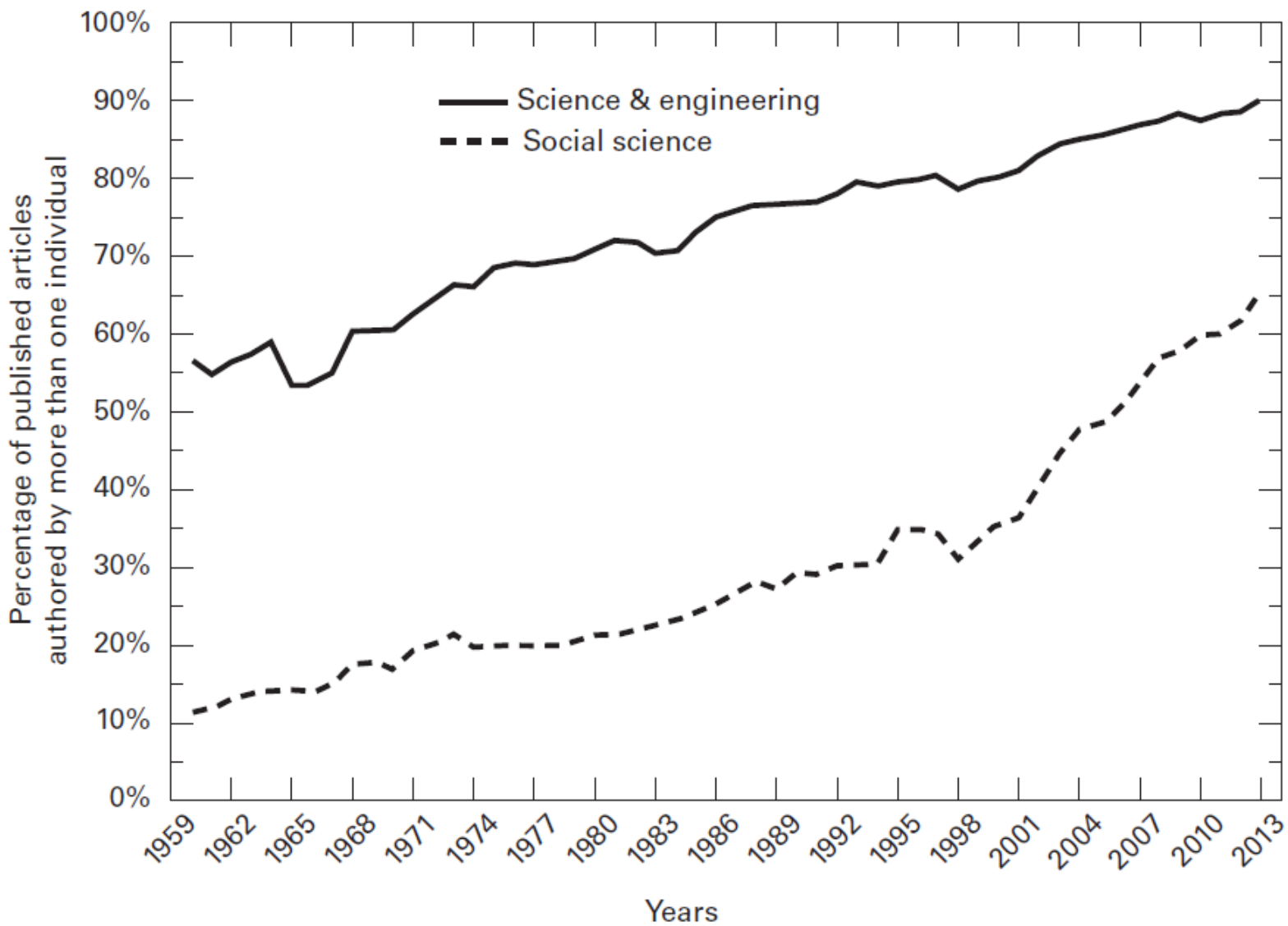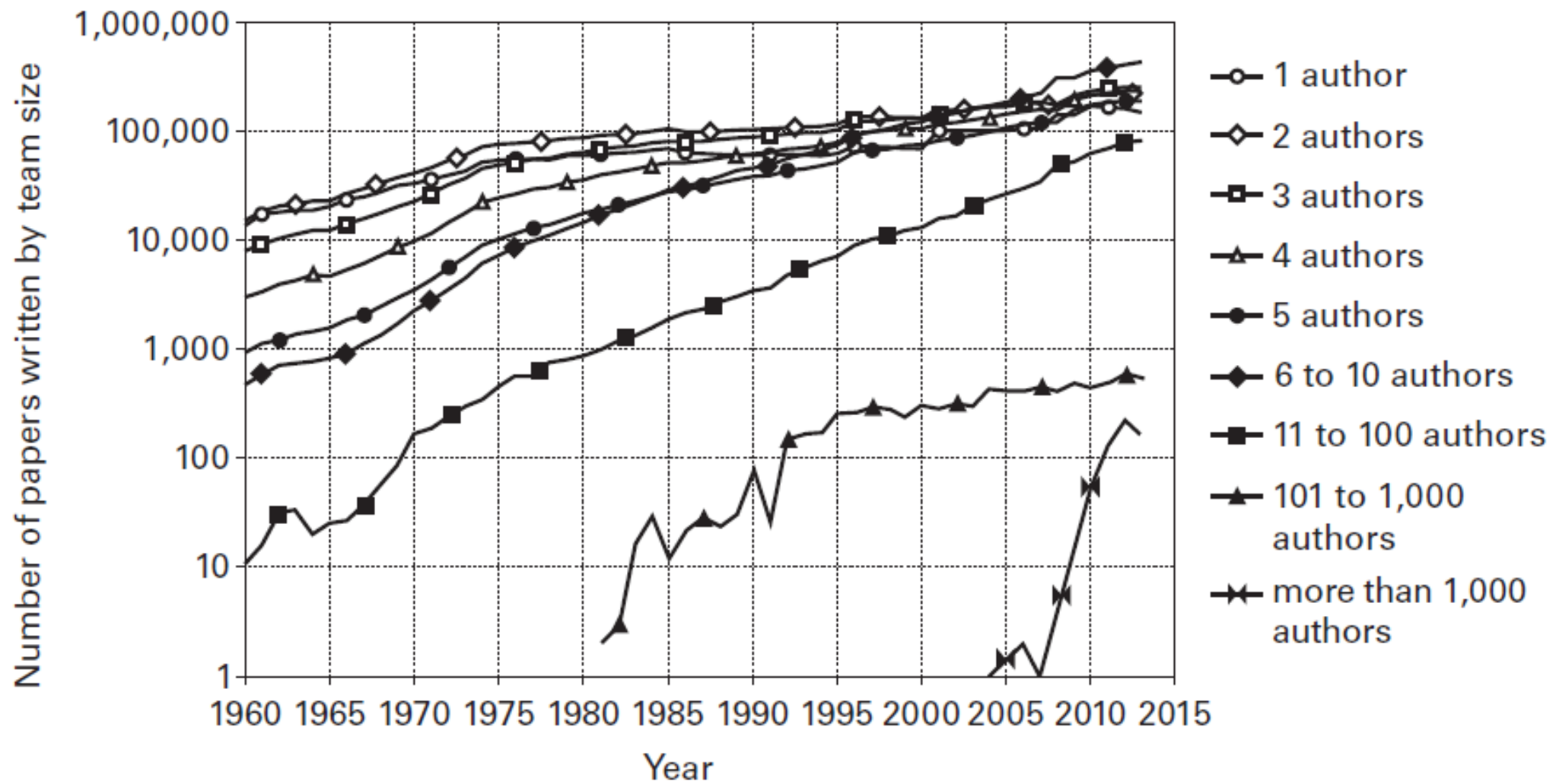
Why do we Collaborate/Partner?

- Others bring something to the table we don't have
  - Ideas
  - Capabilities
  - Technologies
  - Prestige
  - Funding
  - Linkages
- Expands our opportunity space
- Allows us to tackle problems beyond our expertise
- Creates new approaches and even disciplines

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Challenges of Collaboration Involving Multiple Disciplines

- Finding people
  - Similarities
  - Constructive differences
  - Getting them interested
  - Communication barriers/lexicon
- Incentives and rewards
- Venues for communicating outcomes
- Promotion and tenure
- → The U of I is EXTREMELY progressive in promoting and actively supporting collaborations across disciplines
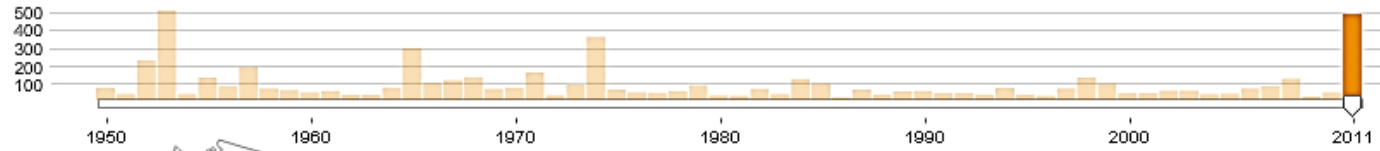
But the REWARDS are Tremendous!

The Challenge of Preventing Tornado-Related Deaths and Injuries: The Year is 1953 (519 Deaths)

Location of hook echo indicating tornado.
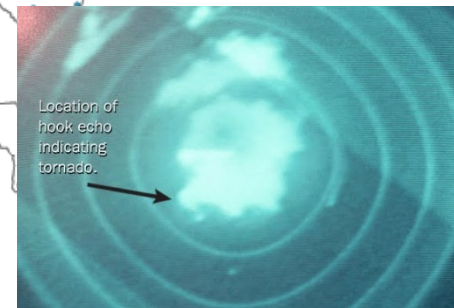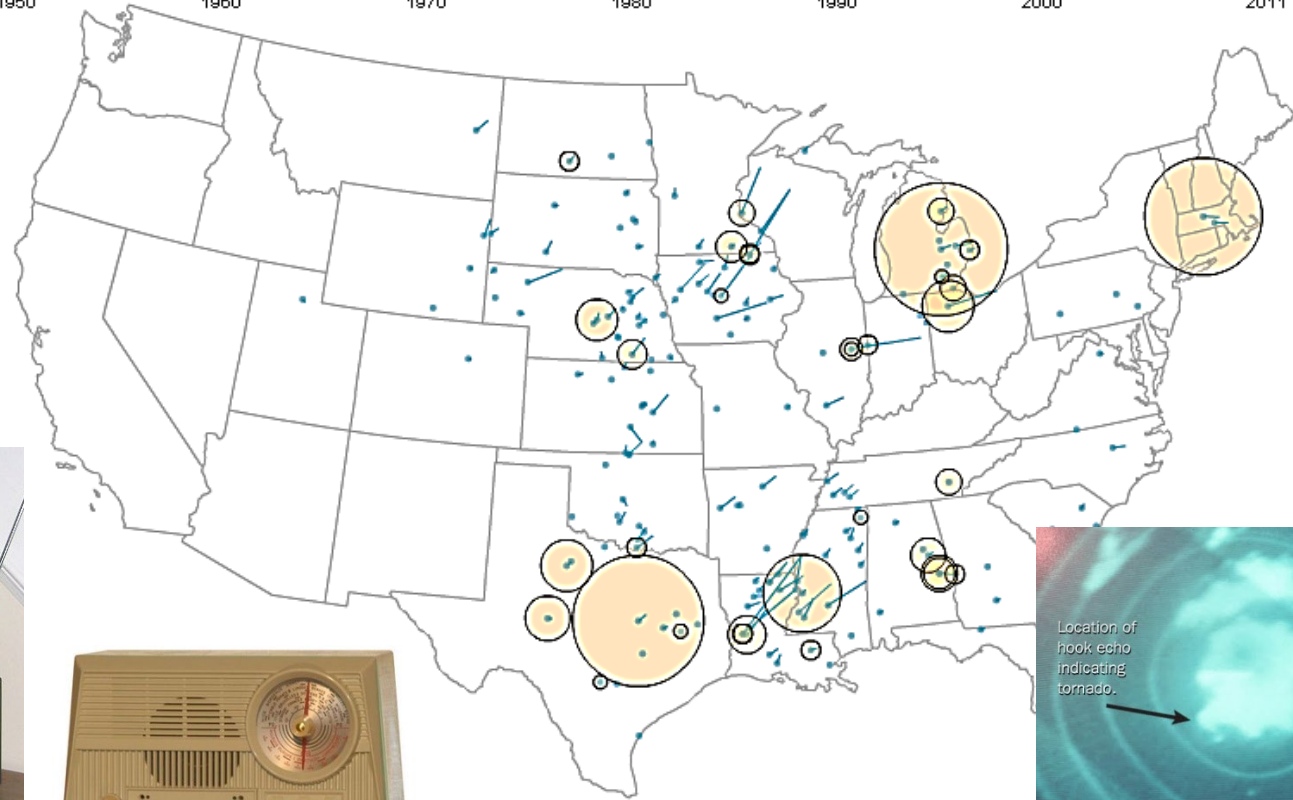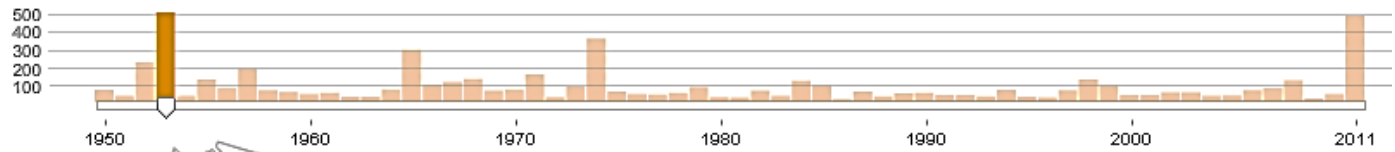
The Challenge of Preventing Tornado-Related Deaths and Injuries: The Year is 2011 (550 Deaths)
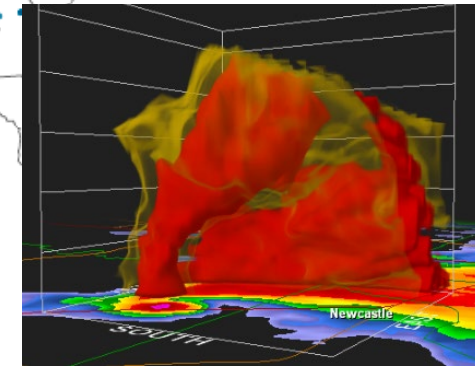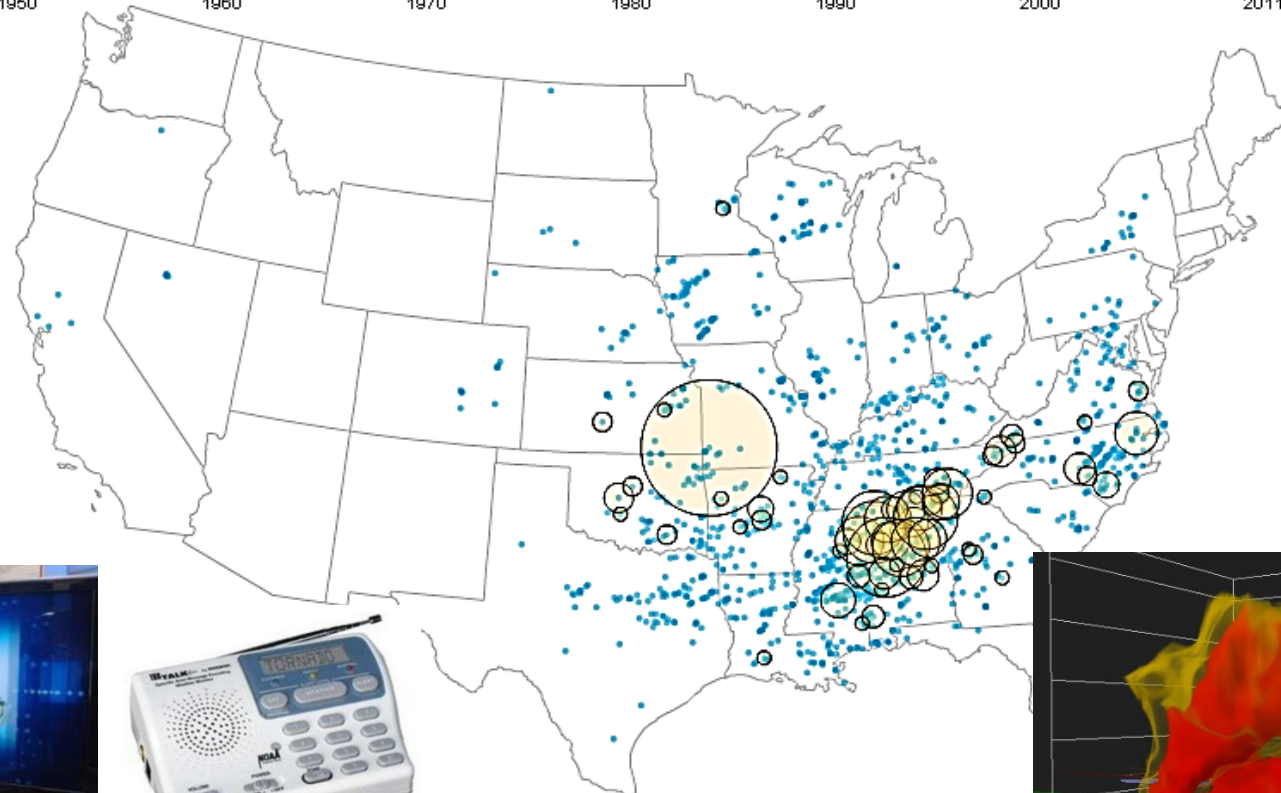
Integrated Social, Behavioral & Physical Sciences
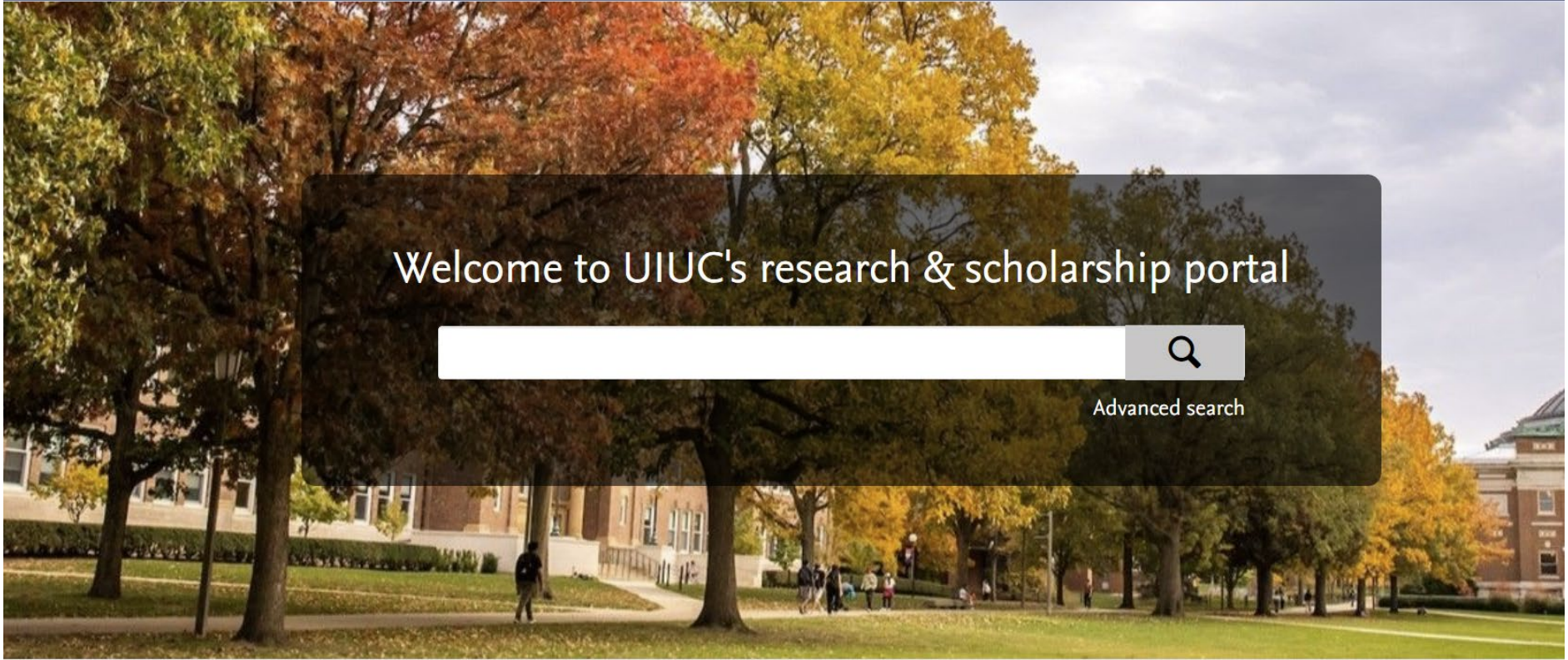
Courtesy NOAA/NSSL

Project collaborative framework
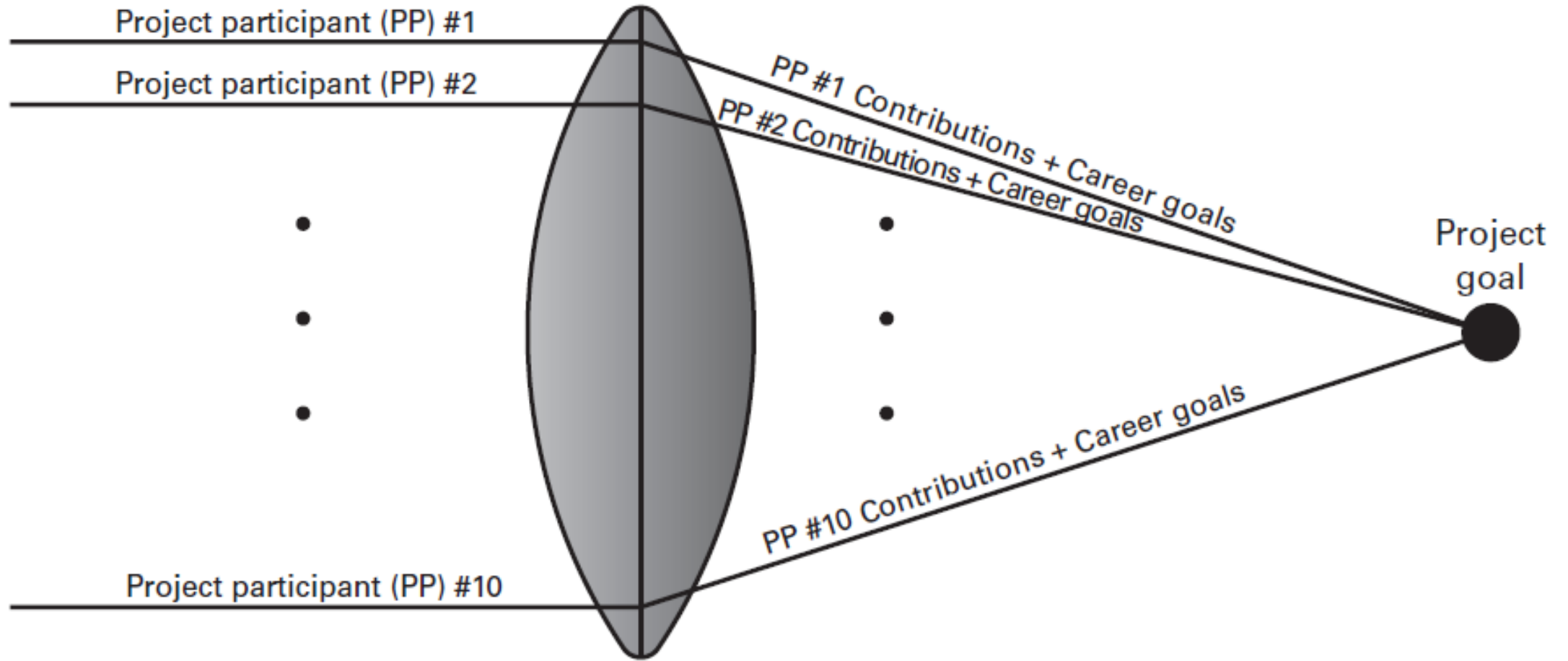
Chapter 14: A Glass Half Empty or Half Full: Challenges and Opportunities for the U.S. Academic Research Enterprise

- Lots of challenges, lots of opportunities (see the book!)
- Challenges
  - Funding and maintaining global leadership in key technology areas
  - Support for arts, fine arts and humanities
  - Promotion of and adherence to scholarly values and ethical principles
  - Educational attainment and student capabilities
  - Diversity, equity, inclusion, belonging
  - Balancing security with an open scholarly enterprise

Chapter 14: A Glass Half Empty or Half Full: Challenges and Opportunities for the U.S. Academic Research Enterprise

- Opportunities
  - Tackling immensely important problems such as climate change, disease, poverty, justice, feeding the world
  - Joining all sectors together (academia, industry, non-profits, government)
  - Dramatically reducing administrative workload – COVID pandemic was the proof of concept
  - **The BIGGEST OPPORTUNITY is for you, as an early career scholar, to HELP SHAPE the future and engage MUCH SOONER because you have learned what took others ENTIRE CAREERS to learn!!**

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Afterword

- Research and creative Activity Accomplish 3 Important Things
  - Inspire Us
  - Unite Us
  - Guide Us
- I believe the scholarly enterprise is one of the last social systems in which the values we cherish – both as members of society and as scholars – are practiced, modeled and preserved
- We must remain the North Star for humanity and show how people of vastly difference characteristics can come together and make the world a better place. We do it all the time. Let's make sure it's noticed!