



Insights and advice for a research career

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Faculty of Medicine

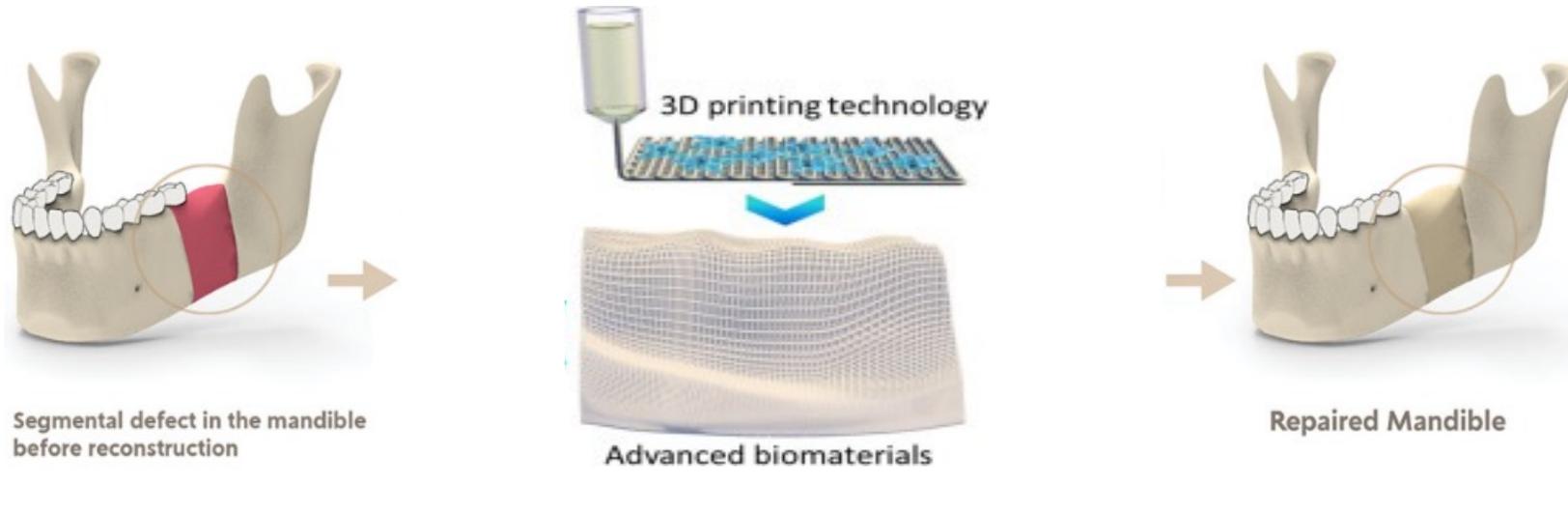
University of Turku

About me:

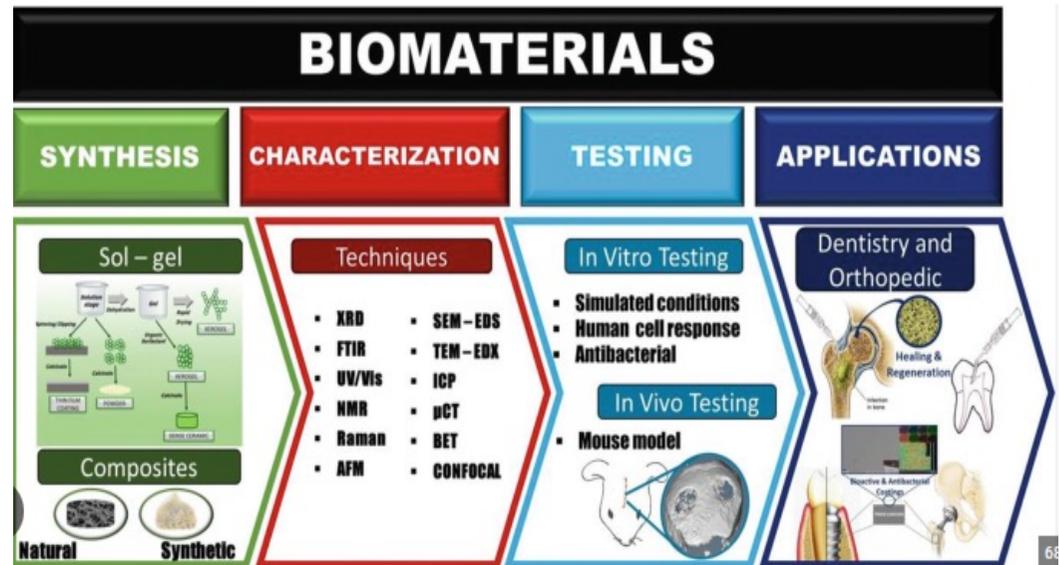
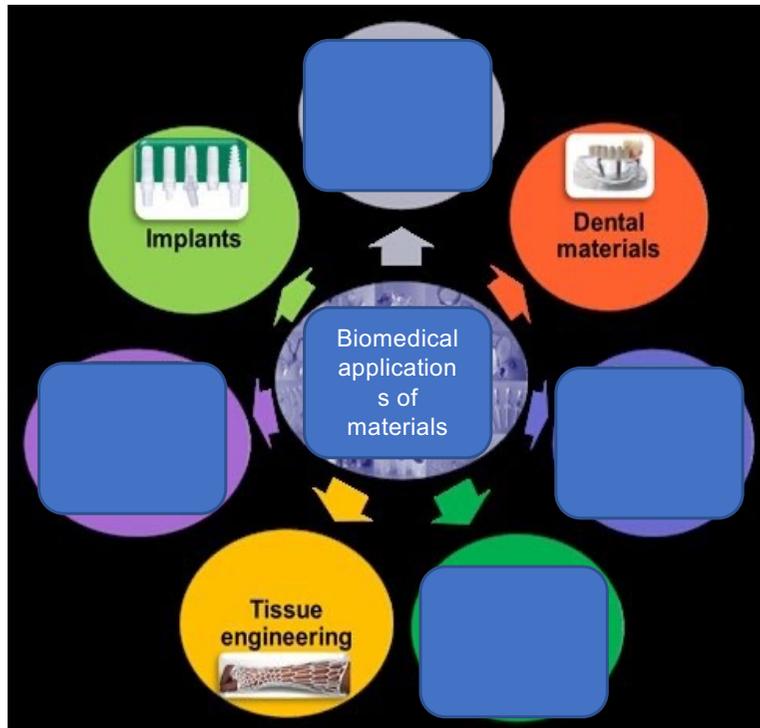
- 2023: Grant (postdoc) researcher, Suomen Lääketiedesäätiö (2 years)
Project: 3D printed biopolymer-based implants or scaffolds for the repair of bone defects in the lower jaw
- 2021-2023: University teacher in Biomaterials science Department, Dental institute, Turku University, Finland
- 2021: PhD in Biomaterials science Department, Dental institute, Turku University, Finland.
- 2014: MSc in Removable Prosthodontics: Faculty of Dentistry, Mansoura University, Egypt.
- 2008: BDS from Faculty of Dentistry, Mansoura University, Egypt.



*3D printed biopolymer-based implants or scaffolds for
the repair of bone defects in the lower jaw*

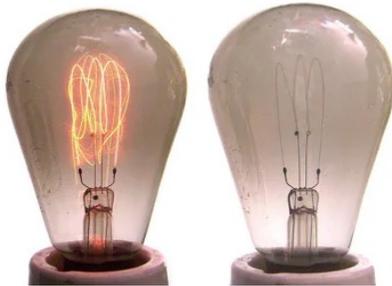


Biomaterials Science Research



The quest to bring light to the world

by Susan Borowski



Two carbon filament bulbs, notice how the glass appears grey thanks to carbon sublimation coating the interior. (Image: Ulf Seifert via Creative Commons)

It was only a couple of centuries ago that great improvements were made in the quest to bring light to the world. For hundreds of years, lamps used

oil, beeswax, kerosene, coal gas or natural gas, all of which came with the danger of burning down whatever they were near. A better light source was needed, and the quest for a better light source continues to this day. The first arc lamp was invented in 1809 when Humphrey Davy, a British chemist, used a battery and two charcoal strips to produce incandescent light. Arc lamps were used to light the streets of Paris in 1841 on an experimental basis, but they proved to be too short-lived to be practical.

In 1879, Thomas Edison and Joseph Swan, a British chemist, separately developed an

- (Before) **oil , beeswax, coal gas (danger of burnin)**
- (1879) **incandescent lamp using a carbon fiber filament** by Thomas Edison and Joseph Swan
- (1881) the Savoy Theater in London (first public building lit by electricity).

osmium and tantalum filaments (higher melting points)

- (1896) **x-rays lamp** by Thomas Edison.

However, Edison abandoned x-rays research after nearly losing his sight and after his assistant, Clarence Dally, lost his left arm and right hand due to radiation exposure.



- (1906) **Tungsten filaments bulbs** developed by the General Electric Company and William Coolidge.

BUT....., converts from a solid to a gas when sublime, however black film coat of the bulb, reducing the light output.

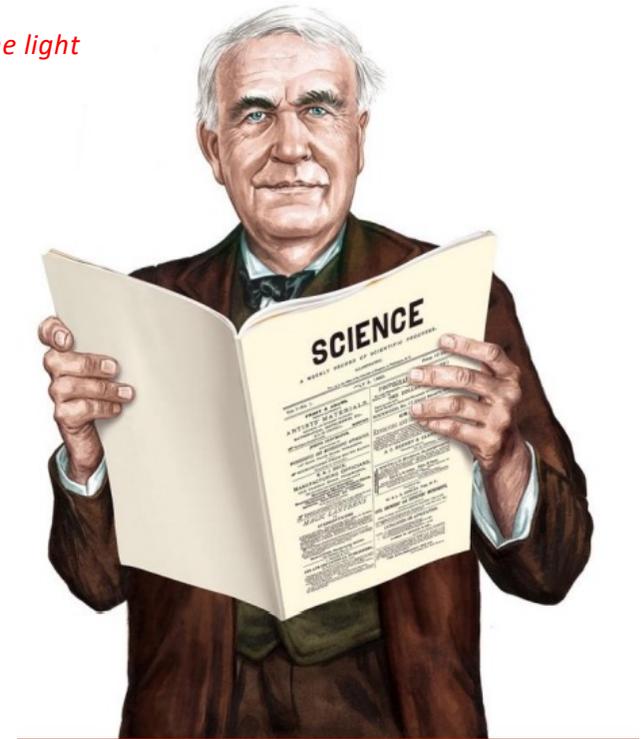
- 1970s **fluorescent light bulbs** (more efficient)
- (2013) **the Fipel bulb** (mercury-free) by Prof. David Carroll

- (After) **LED bulbs**

the same light as a 60-watt incandescent bulb

1/10 wattage used,

may last two decades.



Two main objectives behind scientific research: Problem solving and improving the quality of life



Traditional path for researchers

Academia



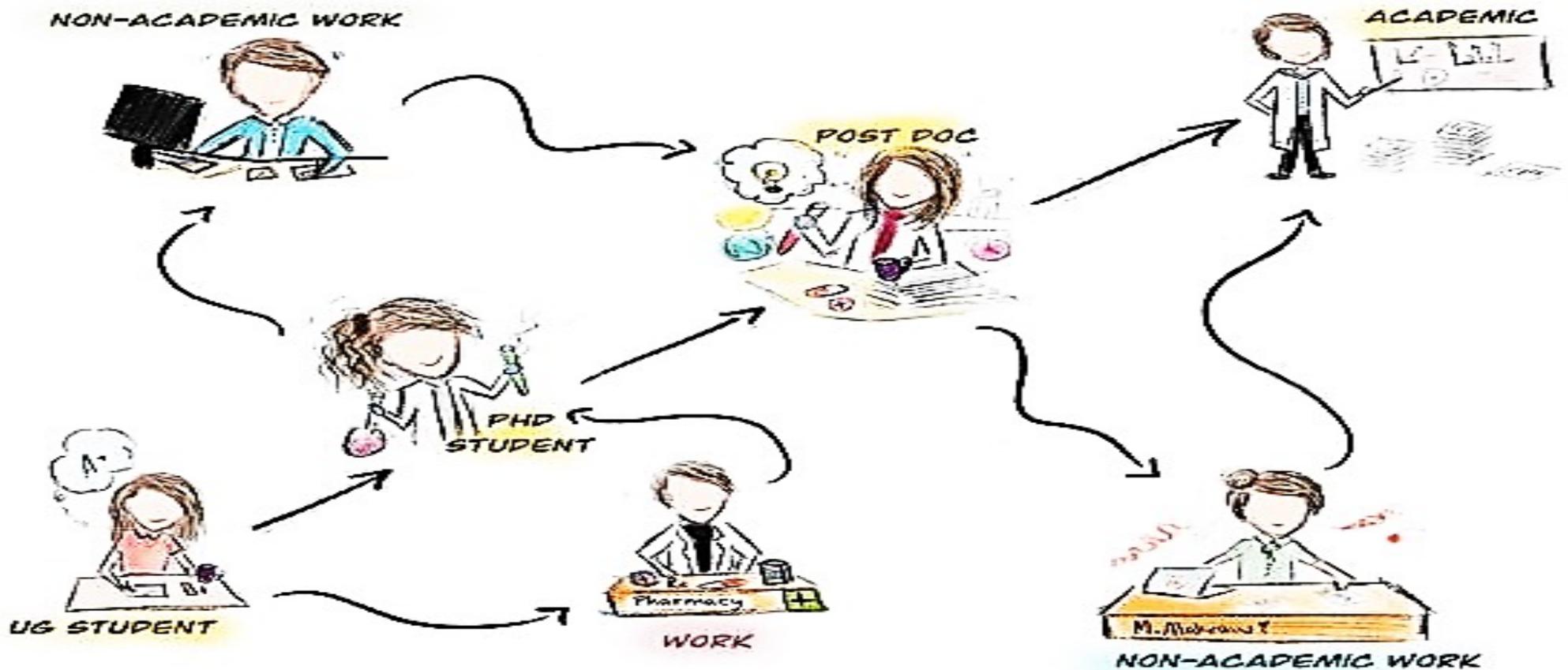
or



Industry?

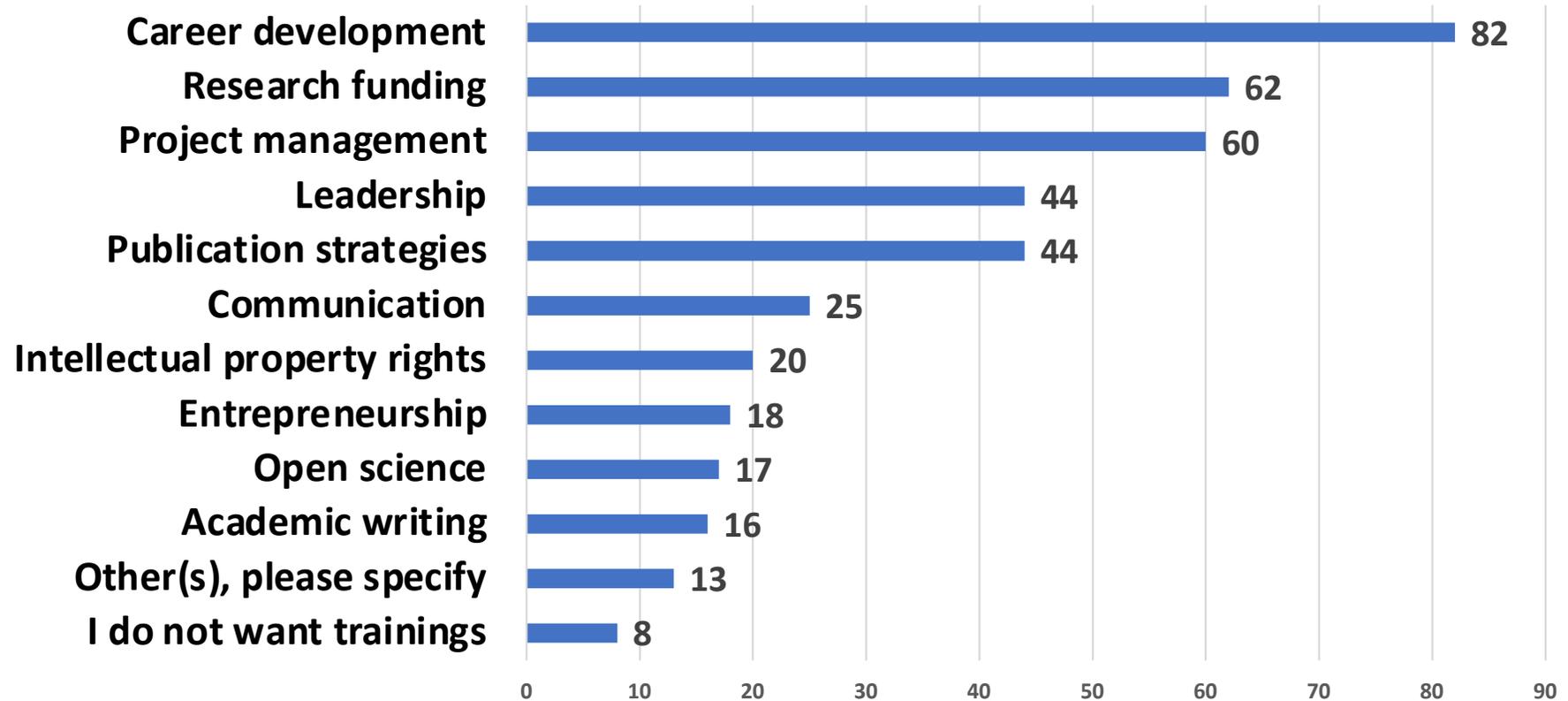


Traditional path for researchers



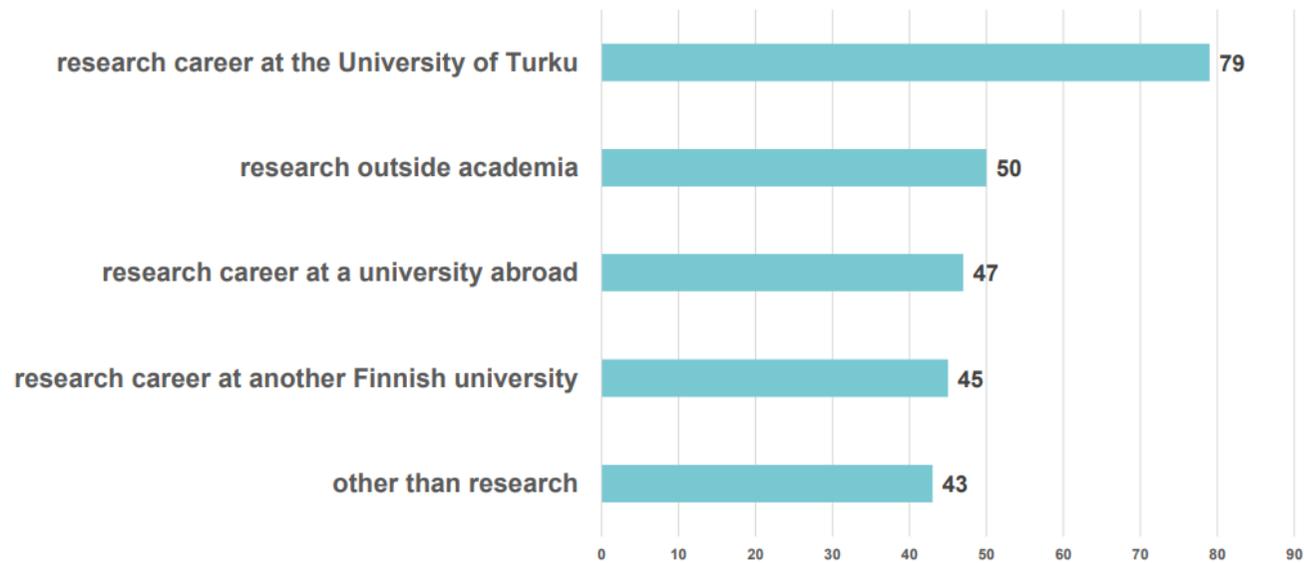
On which topics would you like to get training?

(number of selected answers: 409)



What kind of career plans do you have after the post doc period?

(number of selected answers: 264)



How to find the right career?

1. Take self-assessments
2. Exploring options
3. Make a career plan
4. Build new skills
5. Start job searching



1. Take self-assessments

ACADEMIA

Pros:

- Intellectual stimulation.
- flexible schedule (a good work-life balance)
- Autonomy in choosing research project.
- More creativity and innovation.
- Networking (opportunities to collaborate).
- Job security (Tenured positions)

Cons :

- Limited funding (limited and difficult to obtain)
- Need for frequent publication in reputable journals
- Highly competitive job market, with many qualified individuals and limited number of positions.
- Administrative duties (teaching or committee work)
- Limited career mobility
- few opportunities to advance beyond a certain level.

Make a pros and cons list

INDUSTRY

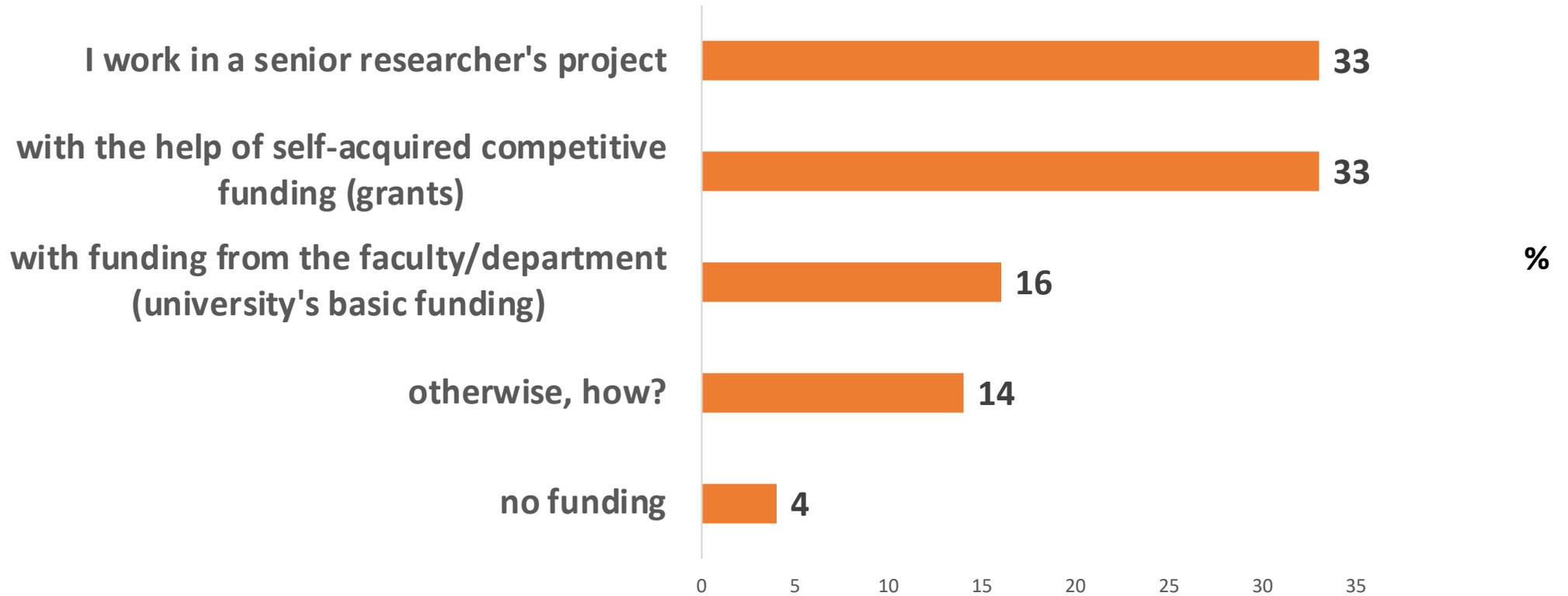
Pros:

- More funding and resources
- More sophisticated research projects and access to advanced equipment and technology.
- Industry research move in a Faster pace (focus on developing products and bringing them to market quickly).
- Competitive salaries and more comprehensive benefits packages.
- Opportunities for career advancement/promotion.
- Collaboration with industry professionals

Cons

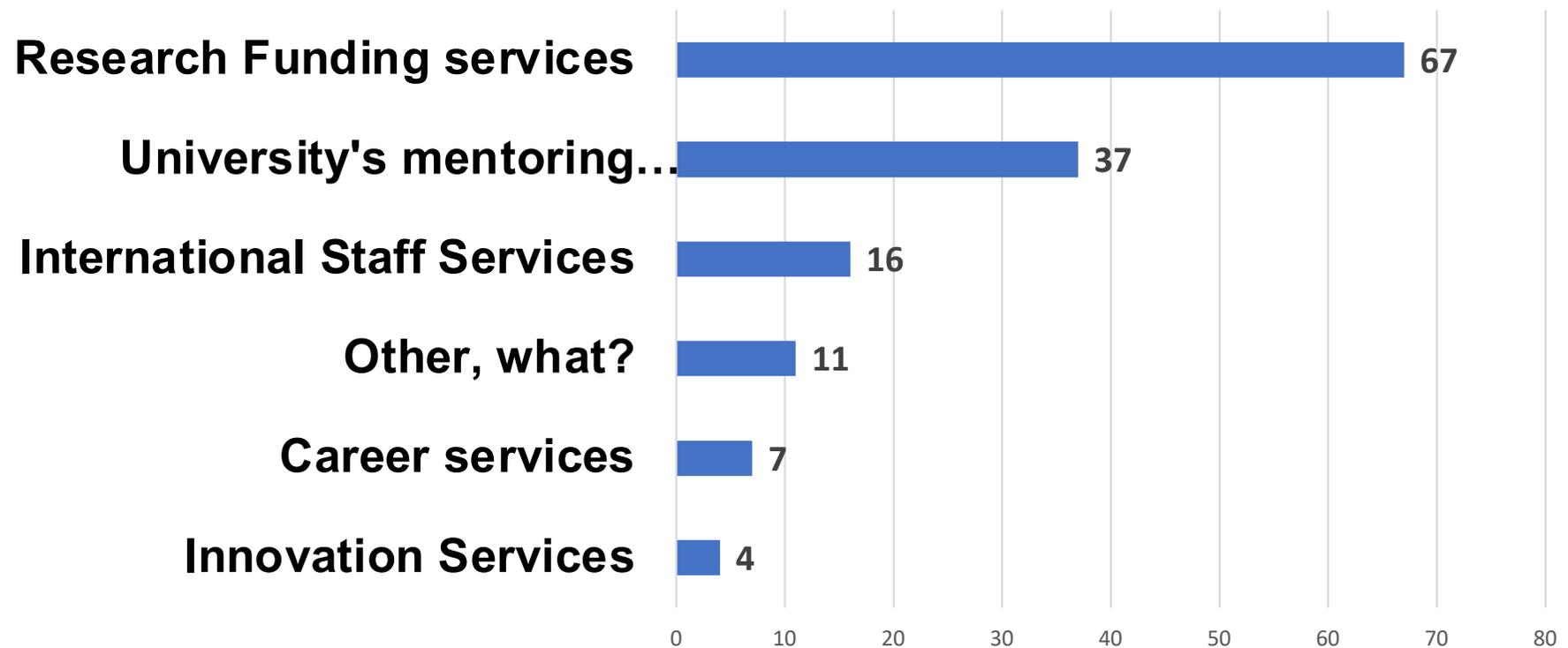
- Focus on profit: short-term results.
- Intellectual property restrictions: on publishing or sharing research.
- Less autonomy: in choosing their research projects.
- Limited job security (positions layoffs or downsizing if a project fails or if the company undergoes restructuring.
- High-pressure environment (highly competitive and stressful, with deadlines).

How do you finance your post doc research at the moment?

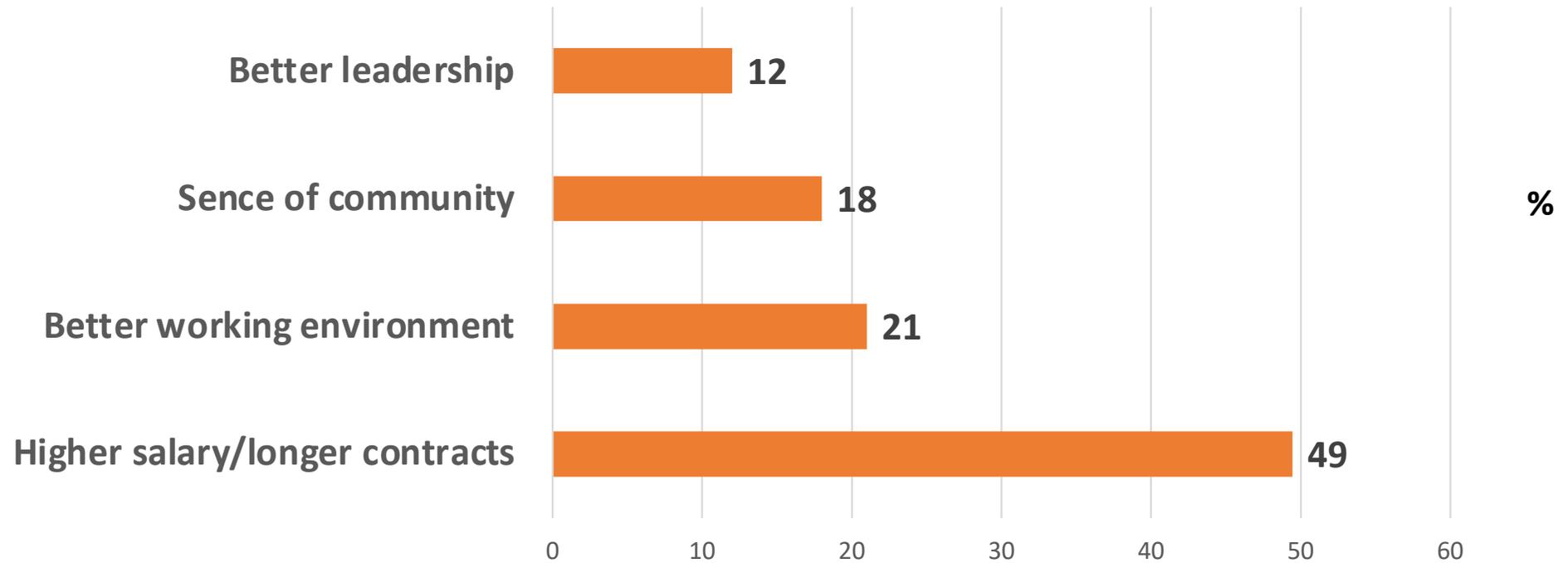


researcher?

(number of selected answers: 142)



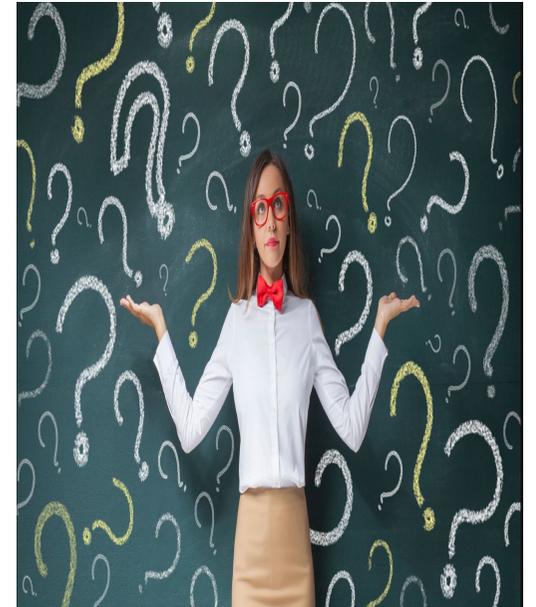
What factors would increase your job satisfaction? (open question)



1. Take self-assessments

✓ Ask your self ?

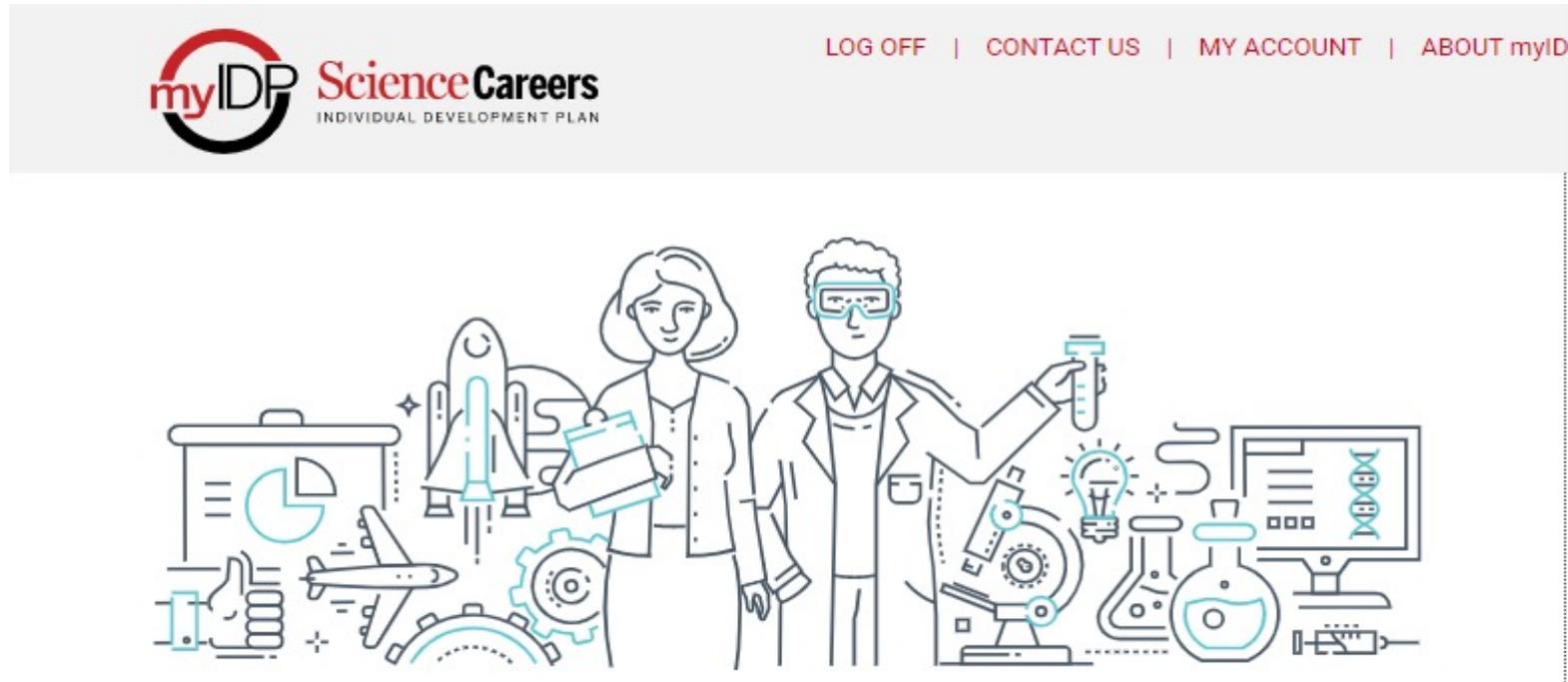
- Would you like to do lab work?
- What would you miss about being in the lab?
- What motivates you?
- What type of tasks and activities interest you?
- How often do you want to change projects?
- Would you like to work independently or as part of a team?



1. Take self-assessments

✓ **Individual development plan (IPD)** (myidp.sciencecareers.org)

A web-based career-planning tool tailored to meet the needs of PhD students and postdocs in the sciences.



1. Take self-assessments

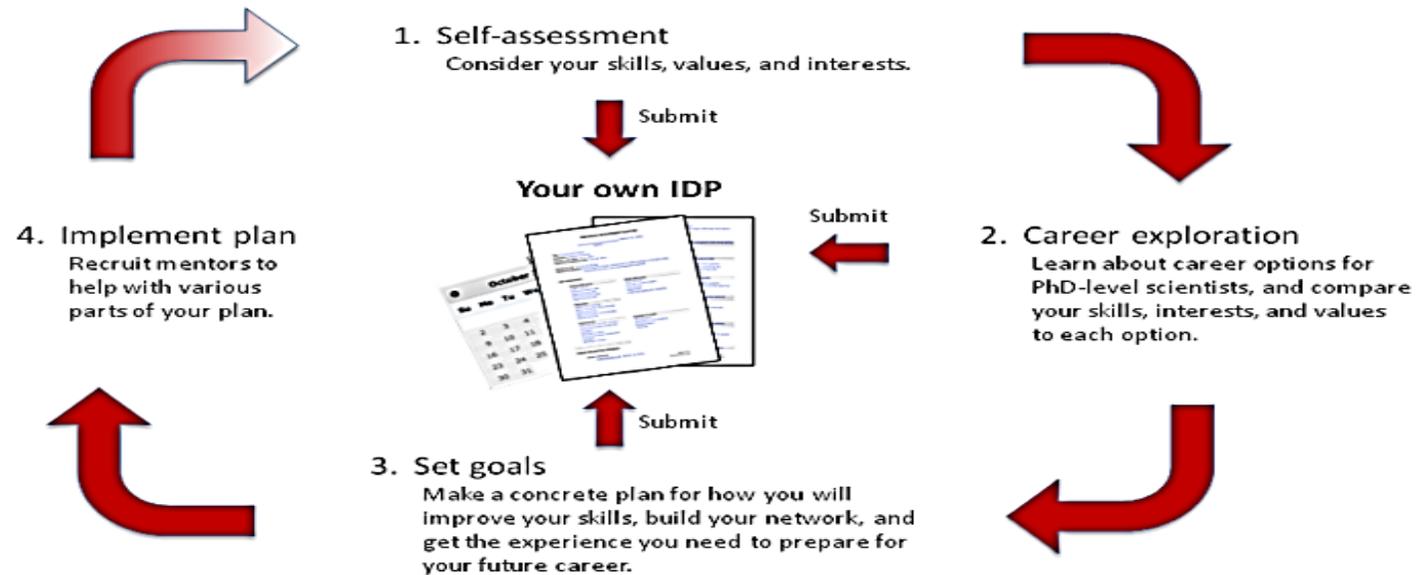
Overview
Overview Summary
Personal Information
Assessment
Skills Assessment
Interests Assessment
Values Assessment
Career Exploration
Consider Career Fit
Read About Careers
Attend Events
Talk to People
Choose a Career Path
Set Goals
Career Advancement Goals
Skill Goals
Project Goals
Implement Plan
Mentoring Team
myIDP Summary

Individual Development Plan Overview

An Individual Development Plan (IDP) is a structured planning tool designed to help you:

- Identify **long-term career goals** that fit with your unique skills, interests, and values,
- make a plan for **improving your skills**,
- set goals for the coming year to **improve efficiency and productivity**, and
- structure **productive conversations with your mentor(s)** about your career plans and development.

This module will guide you through the process of creating an IDP:



1. Take self-assessments

Overview

- Overview Summary
- Personal Information

Assessment

- Skills Assessment**
- Interests Assessment
- Values Assessment

Career Exploration

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Set Goals

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- Skill Goals

Scientific Skills Assessment

Previous Step Next Step

Quick Tips My Assessment Summary

Assess your proficiency in these areas on a scale of 1-5 where:

1 = Highly deficient
5 = Highly proficient

Scientific Knowledge

1 = Highly deficient | 5 = Highly proficient

<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Broad based knowledge of science
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Deep knowledge of my specific research area
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Critical evaluation of scientific literature

Research Skills

1 = Highly deficient | 5 = Highly proficient

<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Technical skills related to my specific research area
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Experimental design
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Statistical analysis
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Interpretation of data
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Creativity/innovative thinking
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Navigating the peer review process

Communication

1 = Highly deficient | 5 = Highly proficient

1. Take self-assessments

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Career Exploration

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- Career Advancement Goals
- Skill Goals

Interests Assessment

- Quick Tips
- My Assessment
- Summary

If you had the **ideal job**, rate how frequently you would be engaged in the following activities, where:

1 = In my future career, I would **never** like to do this.

5 = In my future career, I would like to do this **often**.

1 = I would like to never do this in my career | 5 = I would like to do this often in my career

<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Designing experiments
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Performing experiments
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Analyzing experimental results
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Planning new scientific projects or developing new research directions
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Writing grant proposals

1 = I would like to never do this in my career | 5 = I would like to do this often in my career

<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Writing scientific manuscripts
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Writing project reports or other business-related correspondence
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Writing position papers or policy papers
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Creating presentations
<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Representing data in figures/illustrations

1 = I would like to never do this in my career | 5 = I would like to do this often in my career

<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	Giving presentations about science
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1. Take self-assessments

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My Assessment

Summary

Rate **how important it is to you** that your future career path matches each of the following values, where:

1 = Unimportant

5 = Essential

1 = Unimportant | 5 = Essential

1 2 3 4 5

Help Society: contribute to betterment of world

1 2 3 4 5

Help Others: be involved with directly helping individuals or small groups

1 2 3 4 5

People Contact: have day-to-day contact with clients or colleagues

1 2 3 4 5

Teamwork: work in collaboration with others as part of a team

1 2 3 4 5

Friendships: Develop close personal relationships with people at work

1 = Unimportant | 5 = Essential

1 2 3 4 5

Congenial Atmosphere: work with friendly colleagues

1 2 3 4 5

Competition: engage in activities that test my abilities/achievements against others' abilities/achievements

1 2 3 4 5

Make Decisions: have authority to decide courses of action, policies, etc.

1 2 3 4 5

Fast Pace: work in a busy atmosphere with frequent deadlines

1 2 3 4 5

Supervision: be directly responsible for work done by others

1 = Unimportant | 5 = Essential

1. Take self-assessments

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- Career Advancement Goals

Consider Career Fit

Quick Tips

My Career Path Matches

The table below lists career paths commonly followed by PhD-level scientists.

Click on the percentages in the right-hand columns to see how your skills and interests compare to the skills and activities most important to each career path category (as rated by professional career advisors). [Return to the Quick Tips](#) to learn about how these match scores were calculated. NOTE: Do not feel that these results limit your career options. You may be able to improve key skills to allow success in any career path.

Click anywhere in the "Values" column for a list of questions to help you think about how your values may fit into each path. Keep these questions in mind as you learn more about each career path in later sections of the module.

Career Path	Skills Match	Interests Match	Values
Principal investigator in a research-intensive institution: Independent researcher at a medical school, private research institute, government lab or university with minimal teaching responsibilities	0%	0%	<i>Consider Your Values!</i>
Research in industry: Discovery or preclinical researcher; manager of a research team or facility	0%	0%	
Research staff in a research-intensive institution: Staff scientist or researcher in academia or government, lab manager, director of a multi-user research facility in an academic institution	0%	0%	
Combined research and teaching careers:	0%	0%	

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Skill Goals

Read About Careers

Quick Tips

Resources

My Notes

The table below lists the same career paths as on the prior "Consider Career Fit" page, again ordered by degree of match to your skills and interests.

Click on each "Read More" link to find resources associated with each career path.

Career Path	
Principal investigator in a research-intensive institution: Independent researcher at a medical school, private research institute, government lab or university with minimal teaching responsibilities	Read More
Research in industry: Discovery or preclinical researcher; manager of a research team or facility	Read More
Research staff in a research-intensive institution: Staff scientist or researcher in academia or government, lab manager, director of a multi-user research facility in an academic institution	Read More
Combined research and teaching careers: Faculty at a liberal arts college or university whose job includes both research and major teaching responsibilities	Read More
Teaching-intensive careers in academia: A primarily teaching faculty position in a research university, liberal arts college, community college	Read More

1. Take self-assessments

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Project Goals

Implement Plan

Mentoring Team

Skills Development Goals

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Next Step

Quick Tips

My Skills to Improve

My SMART Goals

Choose the skills areas that you want to work on improving this year. We recommend choosing 2-5 skills areas on this page.

Scientific Knowledge

<i>Improve</i>	<i>Skill Area</i>	<i>Your Score</i>
<input type="checkbox"/>	Broad based knowledge of science	n/a
<input type="checkbox"/>	Deep knowledge of my specific research area	n/a
<input type="checkbox"/>	Critical evaluation of scientific literature	n/a

Research Skills

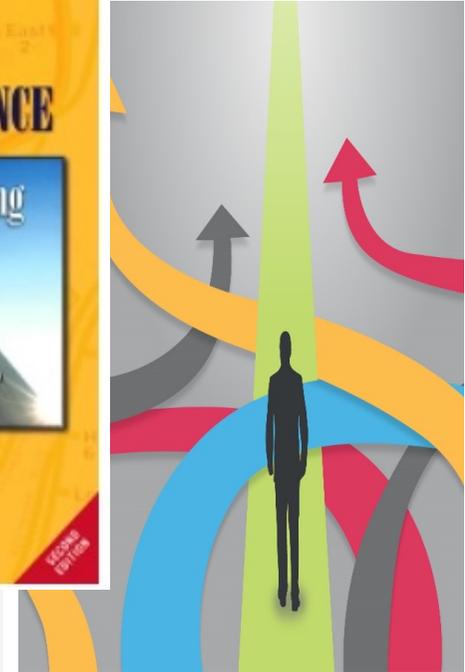
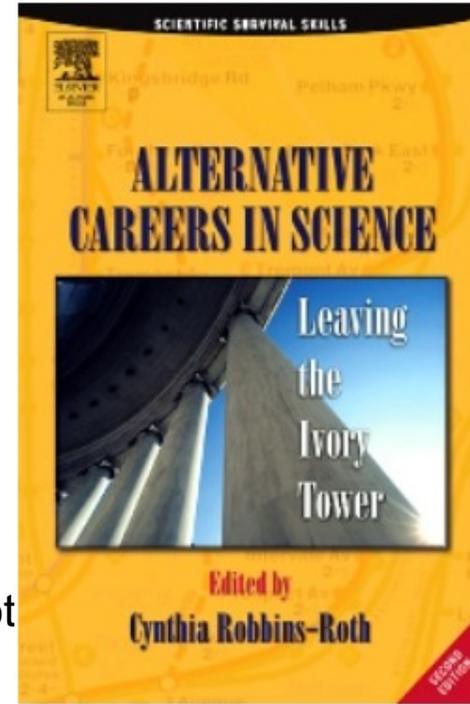
<i>Improve</i>	<i>Skill Area</i>	<i>Your Score</i>
<input type="checkbox"/>	Technical skills related to my specific research area	n/a
<input type="checkbox"/>	Experimental design	n/a
<input type="checkbox"/>	Statistical analysis	n/a
<input type="checkbox"/>	Interpretation of data	n/a
<input type="checkbox"/>	Creativity/innovative thinking	n/a
<input type="checkbox"/>	Navigating the peer review process	n/a

Communication

<i>Improve</i>	<i>Skill Area</i>	<i>Your Score</i>
<input type="checkbox"/>	Basic writing and editing	n/a
<input type="checkbox"/>	Writing scientific publications	n/a
<input type="checkbox"/>	Writing grant proposals	n/a
<input type="checkbox"/>	Writing for nonscientists	n/a

2. Exploring options

- ✓ **Speak with career counselors**
- ✓ **Read about career paths**
 - Advice articles and careers forum
 - Books: *Alternative Careers in Science* - Robbins-Roth



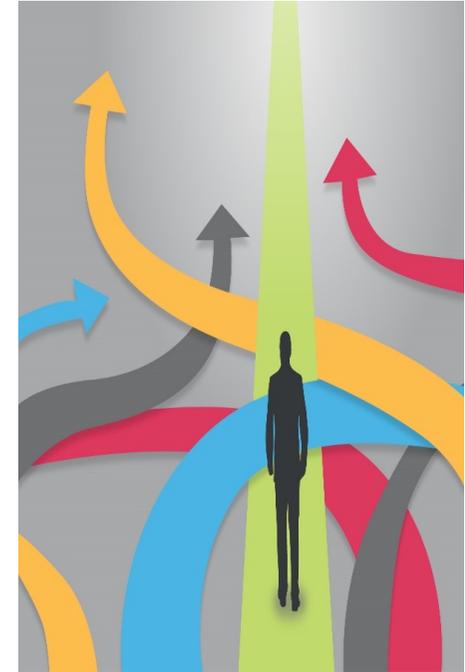
Key Features

- * An insider's look at the wide range of job opportunities for scientists yearning to leave the lab
- * First-person stories from researchers who successfully made the leap from science into finance, journalism, law, public policy, and more.
- * Tips on how to track down and get that job in a new industry
- * Typical day scenarios for each career track
- * List of resources (websites, associations, etc.) to help you in your search

2. Exploring options

Alternative career paths for academic researchers outside academia, including:

1. Industry research (pharmaceuticals, biotechnology, and technology (research and development)
2. Science communication and journalism.
3. Working in funding agencies
4. Academic administration.
5. Science education (develop and teach science courses, design educational programs, or create exhibits.
6. Science consulting services to businesses or governmental agencies.
7. Data analyzing and interpreting.
8. Entrepreneurship/freelance (start their own companies based on their expertise)

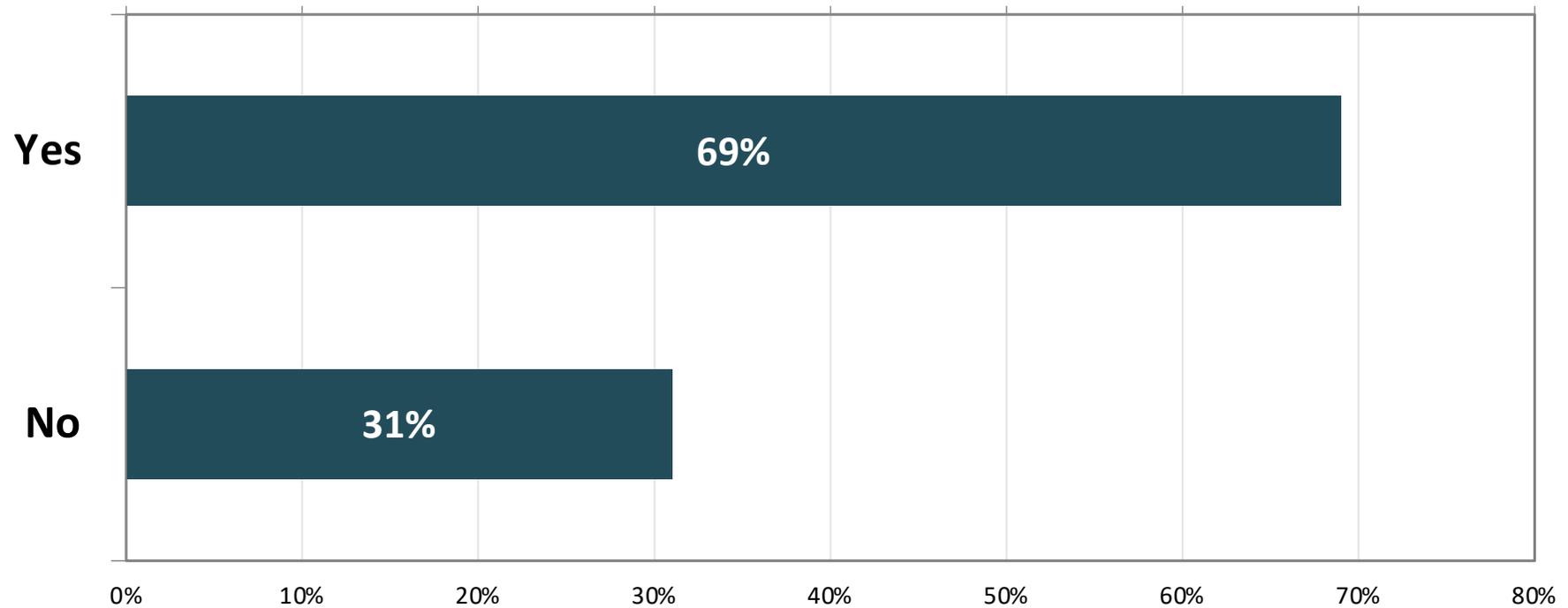


2. Exploring options

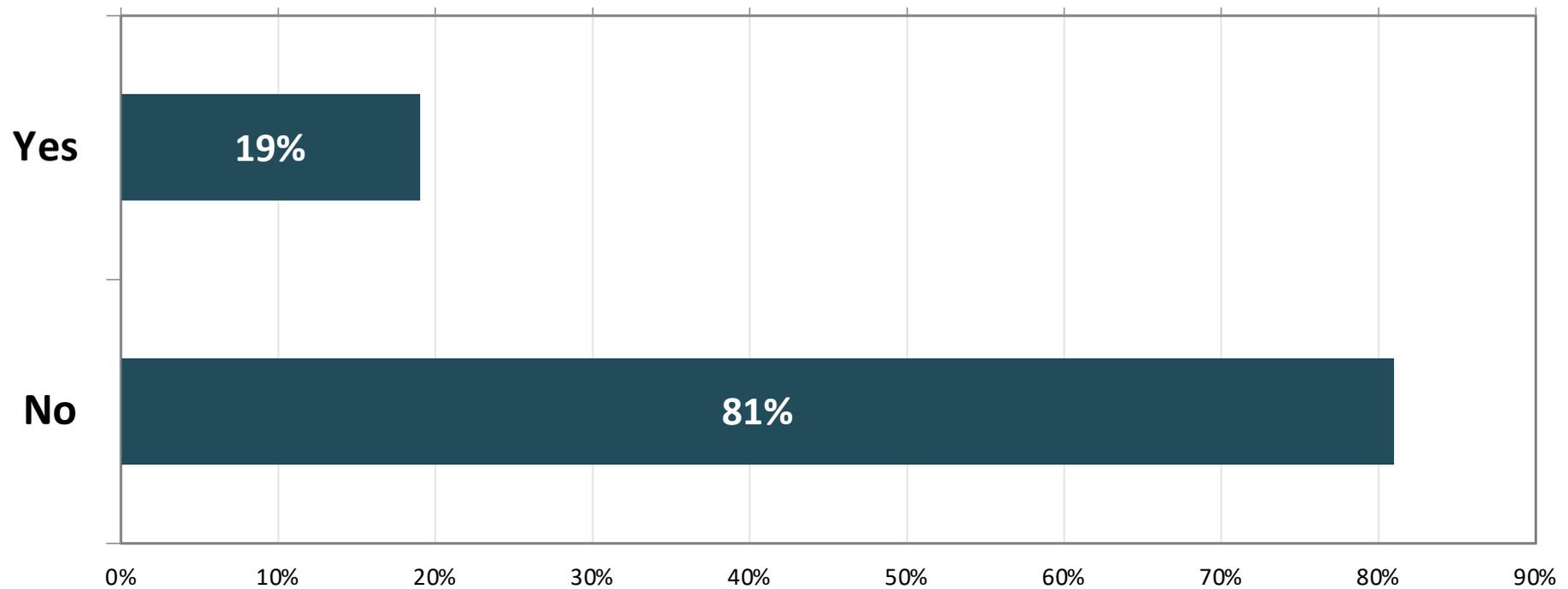
- ✓ **Ask other scientists (informational interviews)**
 - What do you like most or least about this position or field?
 - What steps did you take to break into this field?
 - What skills are most helpful in your job? How can I develop them?
 - What advice would you give somebody interested in your work?



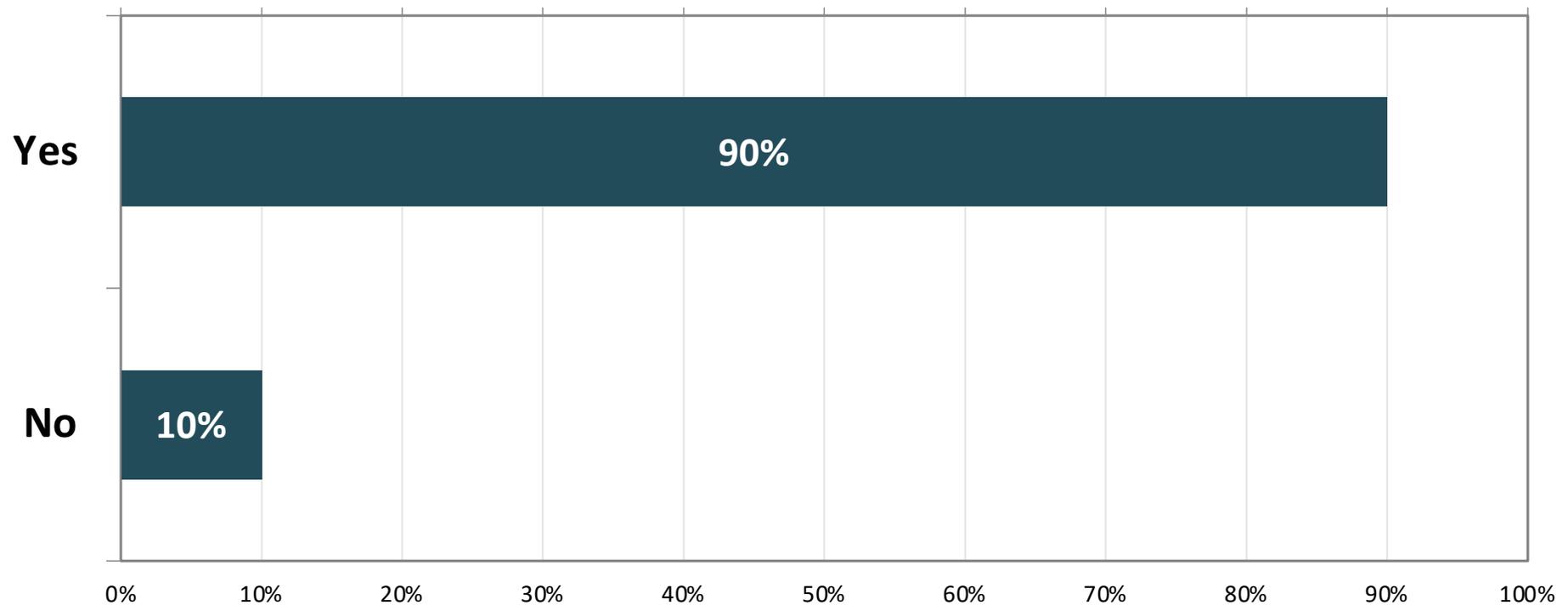
Do you get support in research career issues from a senior researcher?



Has this support relationship etc. been formally agreed upon?



Do you feel that the support of a senior researcher is/would be useful for you?



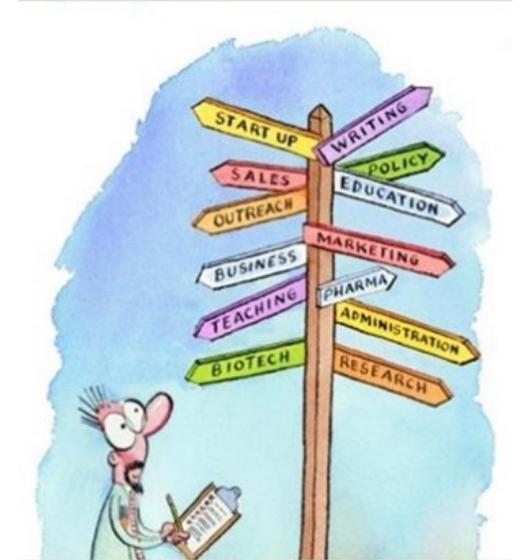
3. Make a career plan

A. Choose a career direction.

- Academia?

B. Determine what skills you have

C. Determine what skills you need

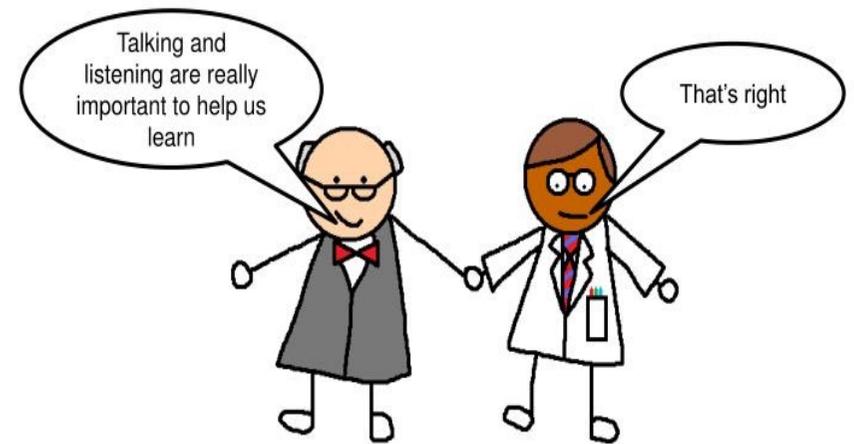


3. Make a career plan

B. Determine what skills you have :

- ✓ Data analysis and management
- ✓ Communication
- ✓ Computer and technical operations
- ✓ Teaching and leadership
- ✓ Teamwork
- ✓ Problem-solving and critical thinking
- ✓ Technical knowledge

Scientists and clever people say talking and listening are really important to help us learn.



3. Make a career plan

C. Determine what skills you need:

- What are the main skills needed for the positions that interest you?
- What skills do employers want?
- How do you make yourself a good fit?

3. Make a career plan

C. Determine what skills you need:

Academic Researcher

- Scientific writing skills (Quality publications)
- Building connections with colleagues—Speaking at conferences (communication skills)
- Find funding
- Writing grant proposals
- Teaching skills



4. Acquire new skills

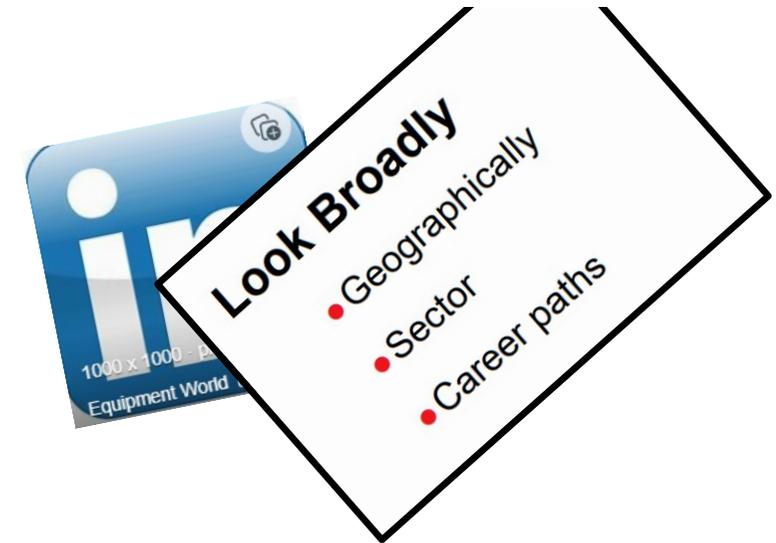
Acquire New Experiences/skills (Self-improvement)

- Try the job informally – Volunteer
- Pursue fellowships
- Attend conferences, workshops, courses
- Internships
- Part-time or temporary jobs

5. Search for a vacant position

- Networking (LinkedIn)
- Job boards
- Institution/company website

(<https://www.utu.fi/en/university/come-work-with-us/open-vacancies>)



utu.fi/en/university/come-work-with-us/open-vacancies

Read more about the University of Turku as an employer >

You can apply for the position by clicking the "Apply for the job" link at the top of the announcement.

ID	Heading	Unit	Application deadline
14907	Postdoctoral researcher's fixed-term position in the Department of Physics and Astronomy	Department of Physics and Astronomy	25.05.2023
14867	Assistant/Associate Professor of Chinese language	School of Languages and Translation Studies	30.05.2023
14901	Senior Researchers or Project Researchers to INVEST Flagship Research Center	Institute of Clinical Medicine	31.05.2023
14884	Senior researcher in sociology, demography or related field	INVEST-yksikko	31.05.2023
14833	Doctoral Researcher / Project Researcher in the field of Product-Service Systems Design	Department of Mechanical and Materials Engineering	31.05.2023
14800	Professor (full) or Assistant / Associate Professor (tenure track) in Electric powertrain	Department of Mechanical and Materials Engineering	05.06.2023
14793	Assistant / Associate Professor (tenure track) in Pharmacology and Drug Development	Institute of Biomedicine	05.06.2023
14923	Internship opportunity in the Partnerships and Strategic Engagement Unit at the University of Turku (7.8.2023-5.1.2024)	YVV-tukipalvelut	05.06.2023

Summary

- Finding the job that matches your chemistry is crucial for your career development
- There's no universal career path for all PhDs
- Make an individual development plan on the basis of self-assessment.
- Build new skills (start during the PhD)
- Keep your options wide open
- Maintain a positive mindset!