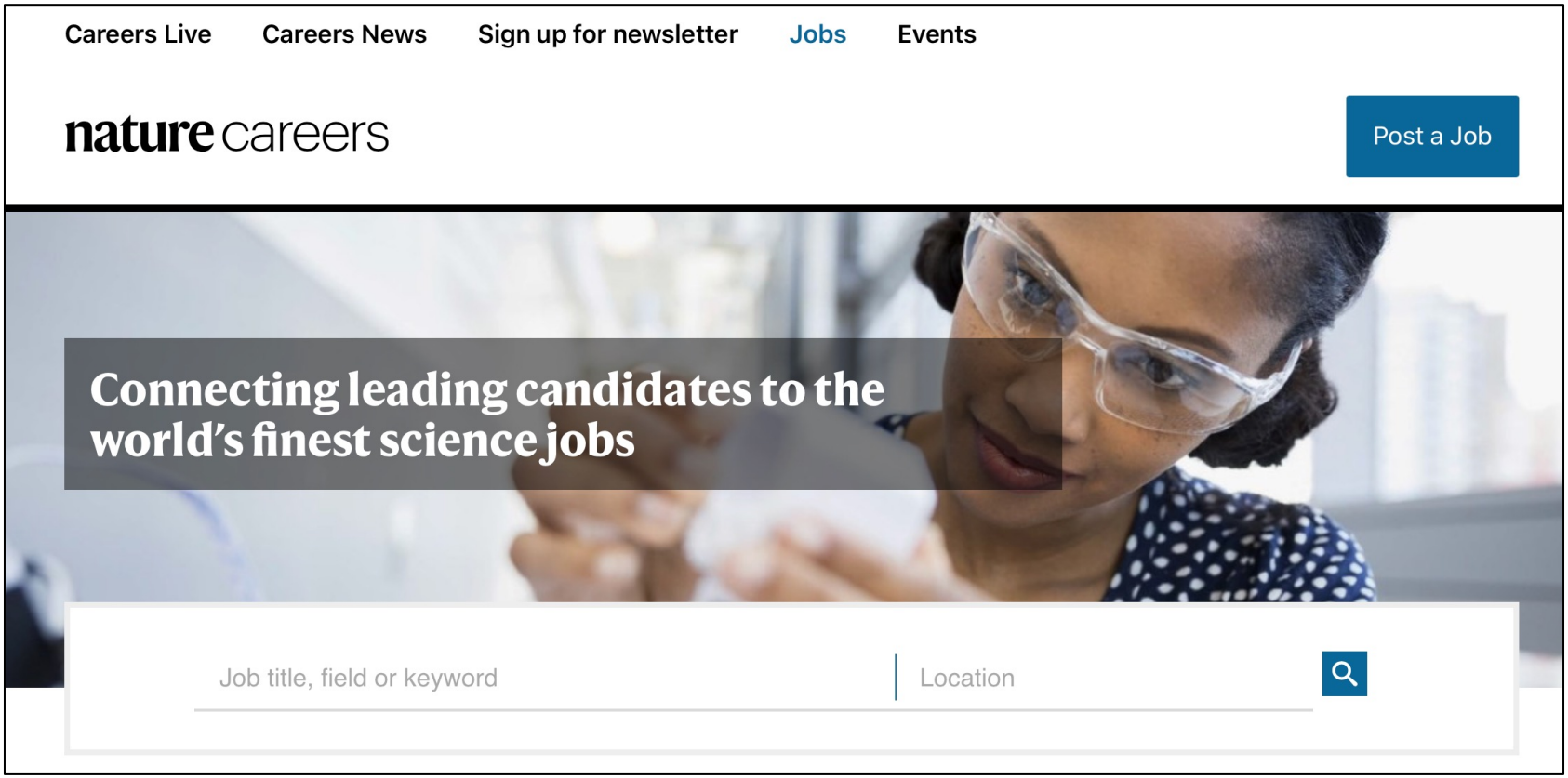
Friday seminar 18.06.2021

Some Ideas about
“How to build a Scientific Career"

Gerrit Lohmann



Some Ideas about "How to build a Scientific Career"

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- **Timeline for faculty at major research centers and universities**
- **The hero's journey**
- **T-shaped skills**

- **The search for knowledge and truth**
- **To be allowed to fail is a great value of science**

Some References

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Talk with discussion

I am often asked about the career in science. **Scientist are individuals and therefore no general rule can be given.** It also differs between countries and subjects. Becoming a scientist usually derives from a natural curiosity about the world around us.

However, I will start with a typical

Timeline for faculty at major research centers and universities

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Timeline for faculty at major research centers and universities

- **Undergraduate/Graduate Studies (~5 years):** Goal: Obtain good grades, become involved in science to acquire experience and gain focus; stipends

- **PhD Studies (~3-4 years):** 3 papers in scientific journals (1 published/accepted, 1 submitted, 1 in preperation), take basic courses in graduate schools, become a tutor for students, be involved into some development of methods, learn the scientific language. Example: Courses at AWI. Hints: Choose active research groups, build first network, organize research stays, regular committee meetings, etc.

European higher education

Studying: massive transformation as a result of the Bologna Process, end of the 1990s.

Its aim: create a homogeneous European higher education area for courses and degrees.

Economisation of education

shifts the focus of higher education from the development of critically thinking personalities to the provision of labor for the labor market - away from education and towards training.

Acceleration leaves less room for independent options

goal of training students more quickly for the labor market: While diploma degree programs lasted an average of 13 semesters in 1998, in 2012 it was only 11 semesters until the Master's degree.

This significant acceleration leaves **less room for independent design options** within and for individual interests outside of the study program. Together with the increased examination burden due to the introduction of the ECT system, this results in greater psychological stress for students.

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What does all this have to do with science?

weakening of the Humboldtian ideal of the unity of research and teaching

Since critical thinking and questioning is also being pushed into the background

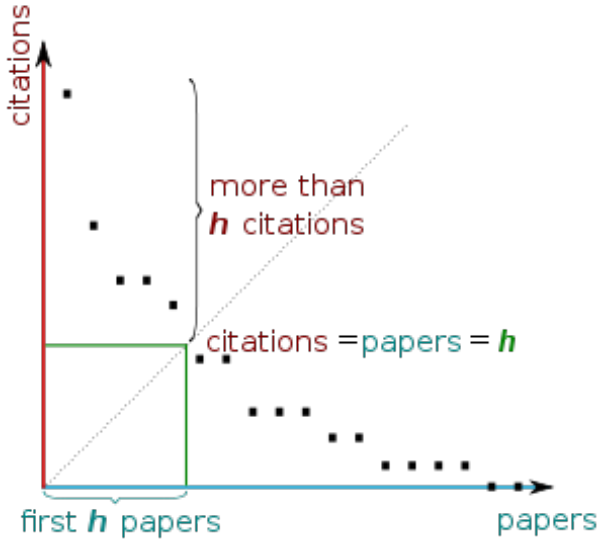
innovative potential of science, which thrives on critically questioning common social practices.

Timeline for faculty at major research centers and universities

- **PostDoc (~5-10 years after PhD):** publish about 1 first-author publication/year, co-authorships, supervise students, involvement into proposal writing, give invited talks. Other activities that might be helpful: convene a session at a conference, become involved into writing of a book chapter, become a referee for a scientific journal, develop methods like Earth System Models or statistical analysis tools, carry out interdisciplinary activities.

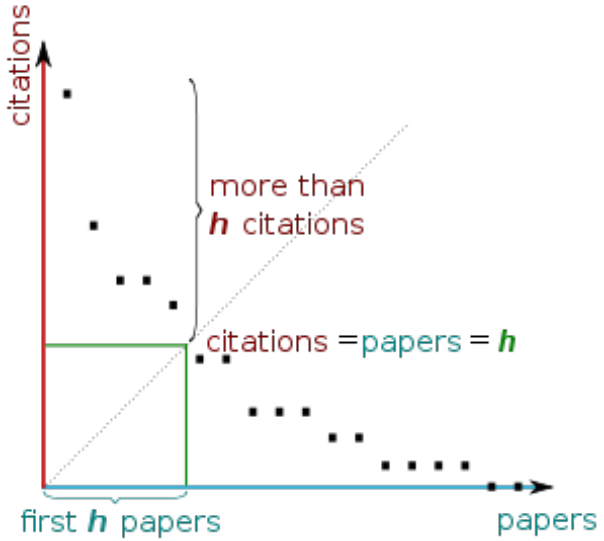
- **Tenure track, application of Junior research group** (~5 years after PhD): publications (h-index>5, 1 first-author publication/year, at least 5 first-author publications, several co-authorships), invited talks at conferences, convening a session at a conference, supervision of students and teaching activities (including a publication where you are the supervisor of a student), PI of research proposals (applicant/co-applicant), major developments of methods. Other activities that might be helpful: involvement into a book, regular referee work, a single author publication, a high-impact publication, a community publication (e.g. for CMIP/PMIP).

H-index



The h-index is defined as the maximum value of h such that the given author/journal has published h papers that have each been cited at least h times.
The m-index is defined as h/n, where n is the number of years since the first published paper of the scientist.
Hirsch estimated that after 20 years a “successful scientist” would have an h-index of 20, an “outstanding scientist” would have an h-index of 40, and a “truly unique” individual would have an h-index of 60.

H-index



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Quickly judge “quality” of research output

Taken alone the h index has no significance unless for bureaucrats that believe they can judge a career using a single number because they lack both the scientific culture and the will to judge the quality.

Citations are one of the few ways that institutions use to quickly judge “quality” of research output on an individual level. These indices are certainly used for promotion applications. Although unhelpful, the true answer is ‘the higher the h-index the better’.

Timeline for faculty at major research centers and universities

- **Tenure/Senior Scientist/Lecturer (~10 years after PhD):** publications (h-index>10, m-index>1.0, 1 first-author publication/year, several co-authorships or main supervisor of a high-impact paper), research proposals, Student/PhD supervision, above mentioned criteria like methodological aspects, becoming an editor of a journal/book series, involvement into selection committees, reviewer committees for theses or research projects, project management and outreach activities, reasonable knowledge of the local language. For orientation: procedures at AWI

- **Professor level (~15 years after PhD):** publications (h-index>20, m-index>1.5, about 1 first-author publication/year, several co-authorships or main supervisor of a high-impact paper), several teaching activities, writing major research proposals, supervision of students, see also above mentioned criteria, see e.g. academics. In former times a Habilitation or equivalent was required (basically a second thesis plus teaching), now the way is more through a Junior professorship and junior research group, or just through an excellent research and teaching profile. Specific rules are probably country-dependent.

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- At some research institutions, there might be more ways to get a **position which is typically more in the technical area.** For those positions, some criteria are the involvement into projects, publications, technical developments, labs experience (more technical, #very limited limited, PhD required), project management, dual career, research stays

Interests fit & Mentoring

Important is that **your ideas and interests fit with the research institution**. Please be aware of the local language and culture. Check furthermore the specific interests and tasks of the institutions! See e.g. at AWI, the polar and marine focus.

Sometimes, choosing a good research project is not something that comes out of a rational process. One goes to a seminar on something that seems very remote from one's theme and suddenly realizes to have the tools to tackle this problem.

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At many institutions, there exist **formal or informal ways for mentoring.** At AWI, we offer annual one-on-one meetings (in English or German) to discuss the next steps. Here is the link to the AWI annual Employee-Supervisor Reviews (in German and English). See also mentoring programmes, see e.g. at Helmholtz

Reflect on what you are good at, and on your biggest areas for development. This will help you choose the skills and knowledge to prioritize. It is important to have someone who cares about you and your career. A PhD supervisor should be a mentor. Cultivating relationships can result in more opportunities in the future.

Most research institutions value international experiences. A scientist who has experienced the **culture of other laboratories, different leadership styles** and cultural challenges normally develops a much broader view on science and the challenges.

Funding and other challenges

the ability to get funding is one of the biggest challenge for researchers. Economisation of research. Performance-related funding

Look out for specific funding calls relevant to your research. Research councils are a good place to start, with sections on their websites requesting proposals.

Many **professional opportunities come through networking**, rather than online. Talk to people both within and outside your field and test your ideas with them.

Other significant challenges included dealing with heavy workloads; time management; navigating bureaucracy; and knowing how to get published in the right journal.

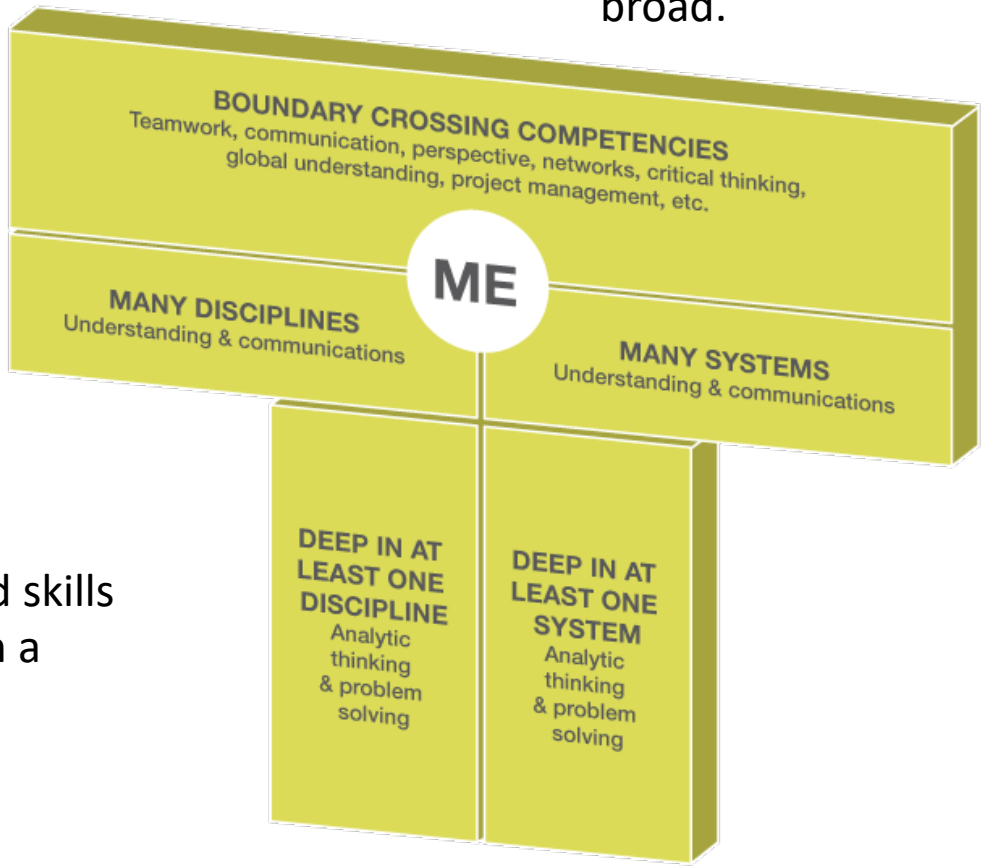
Choosing a niche consciously is a big advantage and may show your leadership skills. However, avoid a niche which is too small because this may limit your possibilities to get funding.

Having ORCID and Google Scholar accounts will make your work searchable and trackable.

The concepts are pretty subjective and derive primarily from experiences in Europe. Only 5 % of all PhD holders and about 10% of all postdocs succeed in becoming a professor/senior stuff. You see also persons who did something special in science without a typical science career, e.g. Hartmut Heinrich

The T concept metaphor

organizations want to hire employees with specialized technical knowledge, but who can also think broadly across disciplines, and apply their knowledge to new settings. “T-shaped” someone whose skills and knowledge are both deep and broad.



depth of related skills and expertise in a single field

ability to collaborate across disciplines with experts in other areas and to apply knowledge in areas of expertise other than one’s own.

To be allowed to fail is a great value of science

The question of the meaning of science, instead of the question of its usefulness. In this way, failure in science would also retain its justification. After all, science is less a story of successes than of crises, failures, errors, courageous attempts and mistakes.

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Usefulness of science & the search for knowledge and truth

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Aristotle: “When all the necessities of life had been acquired, the sciences were found. … This happened first in the regions where people had time. The freedom from constraint, necessity, time pressure and duty, opens up freedom to deal with questions and objects, because one can dispose of your own time without external demands and expectations.

The”useful" result is not a condition, but at most a by-product of a fundamentally self-interested occupation. Wherever science is “rationalised” and functionalised for utility, it becomes a service provider and gives away its essence, the search for knowledge and truth as an end in itself.

This also applies to the scientific habitus itself: If you want to be heard, you have to be loud, not quiet, deliberative and precise. Managerial competences and purpose-driven practices are becoming increasingly important. Academics: becoming knowledge administrators and managers, and the search for truth and knowledge is increasingly taking a back seat.

Most scientist: Regarding the quality-of-life, you get to do challenging, interesting, and varied work. International teams and travel is fantastic as well.

In the literature, please look at the hero's journey. Any character, not just the protagonist, can go through a hero's journey (in German: Heldenreise). One example: Jim Button / Jim Knopf by Michael Ende. In a typical hero's journey you can find elements like The Call to Adventure, Meeting the Mentor, Crossing Thresholds etc.

hero's journey: Jim Knopf