Building a (Successful) Research Group

Workshop at the Heidelberg Laureate Forum 2014

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Introduction

There is no recipe for success [e.g., Richard Branson]
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[e.g., Richard Branson]

but, if you insist,
Introduction

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but, if you insist,

Chance favors the prepared mind [Louis Pasteur]
Introduction

It’s your choice
Introduction
It’s your choice

You can work alone
Introduction

It’s your choice

You can work alone

or in a team
Introduction

The Question of the Day
Is building a research group altogether better for a scientific career than working alone?
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Building a research group as in

- gather and support people who share a common research mission
- e.g., like founding a small company
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better as in

- better research (quality, impact)
- better career prospects (for everyone involved)
- better feelings (being at home)
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The Question of the Day

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- gather and support people who share a common research mission
- e.g., like founding a small company

better as in

- better research (quality, impact)
- better career prospects (for everyone involved)
- better feelings (being at home)

working alone as in

- being responsible for oneself only
- collaborating loosely with others
Remarks:

- I haven’t build a research group myself; I am part of a group, though
- I am biased towards the German academic system
- I am biased towards computer science
- I’ll raise more questions than giving answers to them
Introduction

Pillars of a Research Group
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Pillars of a Research Group

There's

1. People
2. Research
3. Funding

all of which
brought together by
Introduction
Pillars of a Research Group

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all of which **magically**
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Pillars of a Research Group

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You
At the workshop, Ivan Sutherland, winner of the 1988 Turing award, suggested the following amendments: “Research” should come first, and it should be replaced by “Problem”, say, the primary research goal of a research group.
People
People
The Webis Group

Khalid Al-Khatib
Tim Gollub
Steve Göring
Matthias Hagen
Johannes Kiesel

Martin Potthast
Martin Trenkmann
Michael Völske
Henning Wachsmuth
Benno Stein

[www.webis.de]
Questionnaire Results
Questionnaire Results
Are you member of a research group?

Yes: 93% (41 / 44)
Questionnaire Results

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Are you head of a research group?

No: 86% (38 / 44)
Questionnaire Results

Are you member of a research group?

Yes: 93% (41 / 44)

Are you head of a research group?

No: 86% (38 / 44)

Do you plan to pursue a career as a scientist?

Yes: 89% (39 / 44)
People

In One Person
People
In One Person

Recruiter
Leader
Motivator
Mentor
Politician
Marketer
Organizer
People
In One Person

Recruiter
Leader
Motivator
Mentor
Politician
Marketer
Organizer

- Become a talent scout
- Learn to interview people
- Were you ever directly involved in hiring a research scientist?
People

In One Person

Recruiter
Leader
Motivator
Mentor
Politician
Marketer
Organizer

and, time permitting,

Researcher
Remarks:

- Again, Ivan Sutherland remarked that leadership comes first and is the most important thing that keeps a group together. He further made two suggestions:

- In his experience, one cannot learn anything from an interview when hiring a scientist. Instead, the only thing that really helps in making a decision whether or not to hire someone is to talk to someone off-the-record who knows the applicant.

- In a group meeting, answers should always be given in the order of increasing seniority, so that junior researchers have no chance of hiding behind the senior ones and so that they have to come up with their own original thoughts.
Research

“You and Your Research”
Research
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Talk at Bell Labs in 1986 on how to do great research  [transcript]

Richard Hamming (1915-1998)

Turing Award 1968
Research

“You and Your Research”

Talk at Bell Labs in 1986 on how to do great research [transcript]

Characteristics of a great researcher:

- Courage (pick important problems)
- Humility (accept basic problems)
- Drive (work more)
- Skepticism (of one’s own work)
- Focus (i.e., no distractions)

Less effective characteristics include luck, brains, youth, ego, anger, non-conformism, and self-deception.

Richard Hamming (1915-1998)

Turing Award 1968
Questionnaire Results

List the ways you know by which the success of a scientist is measured today.
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1. Publications (33 mentions)
   - by count (21) and
   - rank of the venue (11) and
   - whether one is lead author (1)

2. Impact (29)
   - as such (15) and
   - as measured by citations (14)

3. Funding (25) by amount of money acquired
Questionnaire Results

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3. Funding (25) by amount of money acquired

4. Students taught (16) and what became of them

5. Network (12) by number and rank of collaborators (7), by (prior) affiliation (3), and by recommendations (2)

6. Awards won (11)

7. Professional activities (9), namely event organization (4), program committee work (2), invited talks (2), and other committee work (1)

8. Publicity (6)

9. Science transfer (5) such as patents (3) and products developed (2)

10. Career steps (3) and the time it took to take them

11. Personal skills (2)
Research

You and Your Research Group
Research
You and Your Research Group

Dos

- Support
- Availability
- Interest and enthusiasm
- Domain knowledge and expertise
- Interest in a student’s career
- Good communication
- Constructive feedback
- Direction and structure
- Approachability and rapport
- Experience and interest in supervision

Don’ts

- Too busy to supervise
- Poor feedback
- Lack of commitment and interest
- Conflicts among co-supervisors
- Poor communication or disagreement about the project
- Unrealistic expectations
- Selfishness and disrespectfulness
- Not being up-to-date with the field
- Lack of research experience
- Personality clashes
Research
You and Your Research Group

Beware the Profzi Scheme

When funding runs out, the scheme collapses.
Funding
Once you’re famous, getting funding is easy...
Funding

Once you’re famous, getting funding is easy...

Proposal

Ich benötige 10 000 (zehntausend) Mark

I require 10 000 (ten thousand) Mark
Remarks:

- Otto Warburg (1883-1970), German physiologist, received the Nobel Prize in Physiology or Medicine 1931, was nominated for the Nobel prize an unprecedented three times for three different discoveries, received the Pour le Mérite (Civil Class) 1952, and was a fellow of the Royal Society.

- The proposal shown is a reproduction of a proposal that he allegedly submitted in 1921 to the Notgemeinschaft der Deutschen Wissenschaft (Emergency Association of German Science) and that was funded in full. It was originally published in Willem H. Koppenol, Patricia L. Bounds and Chi V. Dang, Otto Warburg's contributions to current concepts of cancer metabolism, Nature Reviews Cancer, Vol. 11, May 2011, pp. 325-337.

- In 1921, during hyper inflation, a German Mark was still worth about 1/10th a German Goldmark, the gold-backed currency that was used up until World War I. The buying power of 1 Goldmark in 1914 equals 4.87 Euro today, so that Warburg effectively asked for a grant of about 4870 Euro (6255 US Dollar).
Questionnaire Results

How much money have you successfully helped to acquire?

US Dollar (in thousands)

HLF Young Researcher
Some Open Questions

Upper/lower limits:
- How many people are enough?
- How much money is enough?
- What research would you carry out with no limits on people and money?

People:
- How to choose the best candidate for the job?
- When is a PhD student ready to finish his/her PhD?
- How much does a PhD student cost?

You:
- Do you wish to build a research group?
- Do you wish to maintain a hands-on feeling and do things yourself?
- What are your questions?
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Time to get you involved... Thank you!
Remarks:

- During the workshop, Matt Lease from the University of Texas at Austin, head of a group of 5 researchers, joined the discussion with much enthusiasm. He also provides a couple of additional reading tips:
  - Ivan Sutherland (Turing Award, 1988): *Technology and Courage*
  - Imre Leader, June Barrow-Green, Timothy Gowers. *The Princeton Companion to Mathematics. VIII.6 Advice to a Young Mathematician*

- Farther afield, the following publication has a variety of discussion about the importance and value of working on hard problems, as well as stories of how Hilbert and other mathematicians approached such questions themselves. It’s less direct than the reference above, but suggests in general how biographies / histories of mathematicians and computer science may also carry lessons and inspiring stories for us today:
Questionnaire Results

Were you ever directly involved in hiring a research scientist?

No: 68% (30 / 44)