What are your skills? On the transition from university to industry

Stefania Giodini
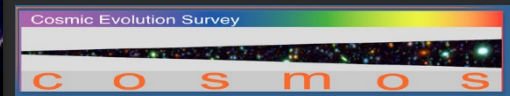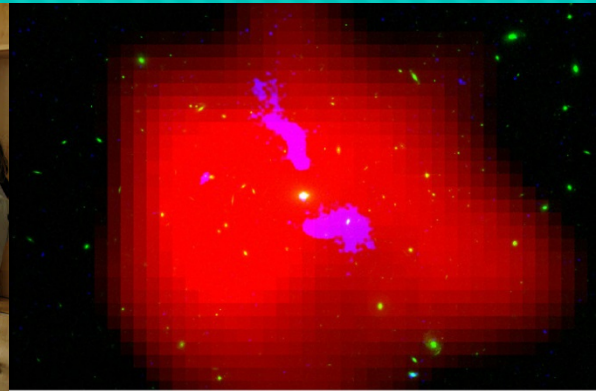*Scientist Innovator, TNO (NL)*

About me

- 2001-2004 BsC Physics
- 2004-2006 Msc Astrophysics & Space Science (Milano - Italy)
- 2007-2010 PhD Astrophysics (Cosmology - MPE Garching)
- 2010-2012 PostDoc   (Cosmology - Leiden Observatory)
- 2010-2012 Visiting Faculty   (High Energy – UMBC)

Now:

(Medior) Scientist in Underwater Robotics and at TNO B.V. (NL)

Before 2012

STELLAR AND TOTAL BARYON MASS FRACTIONS IN GROUPS AND CLUSTERS SINCE REDSHIFT 1

S. Giodini[1], D. Pierini[1], A. Finoguenov[1,2], G. W. Pratt[1], H. Boehringer[1], A. Leauthaud[7], L. Guzzo[3], H. Aussel[13], M. Bolzonella[18], P. Capak[4,14], M. Elvis[5], G. Hasinger[17], O. Ilbert[6], J. S. Kartaltepe[6], A. M. Koekemoer[16], S. J. Lilly[8], R. Massey[14], H. J. McCracken[9], J. Rhodes[14,19], M. Salvato[14], D. B. Sanders[6], N. Z. Scoville[4], S. Sasaki[10,11], V. Smolcic[14], Y. Taniguchi[12], D. Thompson[14,15] AND THE COSMOS COLLABORATION

Submitted for publication in the Astrophysical Journal

ABSTRACT

We investigate if the discrepancy between estimates of the total baryon mass fraction obtained from observations of the cosmic microwave background (CMB) and of galaxy groups/clusters persists when a large sample of groups is considered. To this purpose, 91 candidate X-ray groups/poor clusters at redshift $0.1 \leq z \leq 1$ are selected from the COSMOS 2 deg^2 survey, based only on their X-ray luminosity and extent. This sample is complemented by 27 nearby clusters with a robust, analogous determination of the total and stellar mass inside R_{500}. The total sample of 118 groups and clusters with $z \leq 1$ spans a range in M_{500} of $\sim 10^{13}$–10^{15} M$_\odot$. We find that the stellar mass fraction associated with galaxies at R_{500} decreases with increasing total mass as $M_{500}^{-0.37 \pm 0.04}$, independent of redshift. Estimating the total gas mass fraction from a recently derived, high quality scaling relation, the total baryon mass fraction ($f_{500}^{stars+gas} = f_{500}^{stars} + f_{500}^{gas}$) is found to increase by $\sim 25\%$ when M_{500} increases from $\langle M \rangle = 5 \times 10^{13}$ M$_\odot$ to $\langle M \rangle = 7 \times 10^{14}$ M$_\odot$. After consideration of a plausible contribution due to intra-cluster light (11–22% of the total stellar mass), and gas depletion through the hierarchical

CO] 14 Jul 2009

After 2012

RTOs

Research and Technlology Organizations

Industry

University
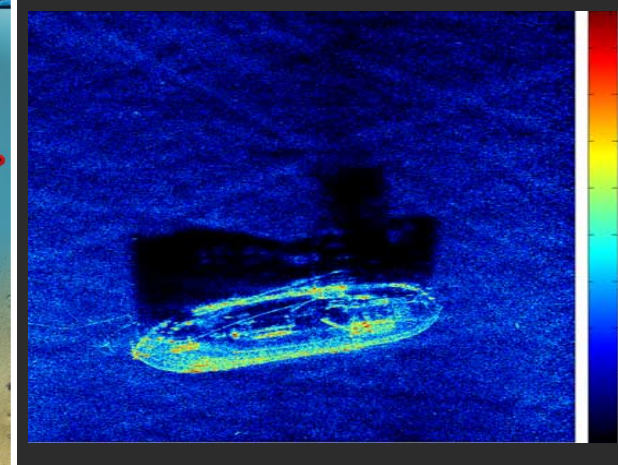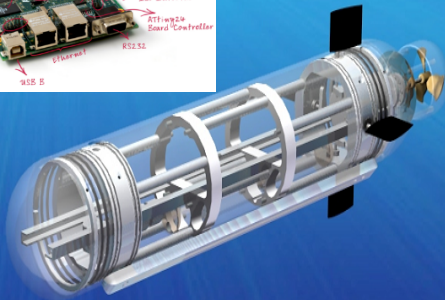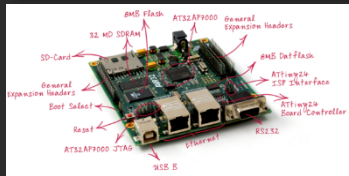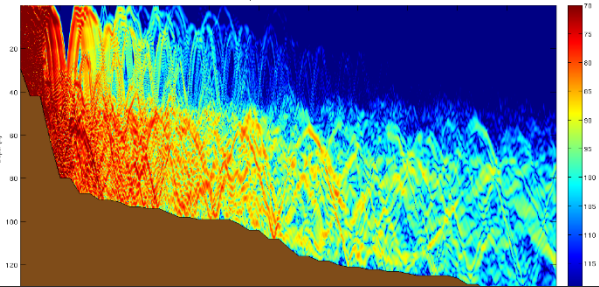
Fraunhofer(DE), Sintef (NO), TNO (NL), VITO (BE), VTC (FI), RISE Network (SE)

My requirement list

- Something related to science & tech
- Something applied / useful to society
- Teamwork
- Growing responsabilities
- In the NL
- International environment
- Travel for business and conferences

What do you need to change career?

- A good CV
- Understanding the skills you already have
- Proactivity & Creativity
- Some tips to survive the Interview
- Transfer your skills to the new work environment

"**After getting (surviving to) a PhD in Astrophysics anything is possible**"

A good CV
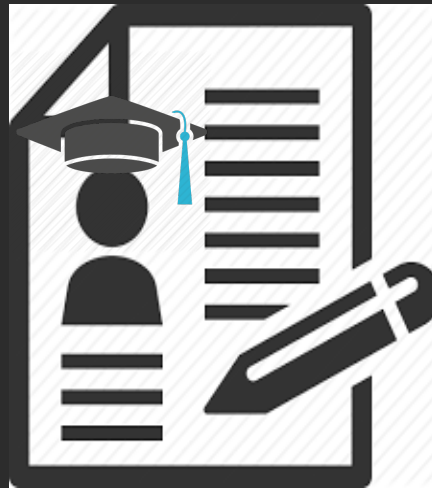
My Astrophysics CV

- **Focus on content**
- **Focus on publications**
- **Intended reader is a professor working on a similar topic**

Stefania Giodini
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Email: giodini@strw.leidenuniv.nl

Education

Ph.D., *Astronomy*, May 2010, Magna cum Laude
Max Planck Institute for Extraterrestrial Physics (Garching, Germany)

M.Sc., *Astrophysics*, December 2006, cum Laude
University of Milano-Bicocca (Italy)

B.Sc., *Physics*, December 2004, 110/110
University of Milano-Bicocca (Italy)

First Author Publications

- Giodini S. , et al. (2010): "Radio Galaxy Feedback in X-ray-selected Groups from COSMOS: The Effect on the Intracluster Medium", The Astrophysical Journal, Volume 714, Issue 1, pp. 218-228
- Giodini S. , et al. (2009):" Stellar and Total Baryon Mass Fractions in Groups and Clusters Since Redshift 1", The Astrophysical Journal, Volume 703, Issue 1, pp. 982-993
- Giodini S. et al. (2011):"The Galaxy Stellar Mass Function of COSMOS X–ray detected groups: evolution and dependence on the environment", to be submitted to A&A

Publications as a co-author

- "Two fossil groups at redshift 0.4 in COSMOS: early build-up of stellar mass, different progenitors" Pierini, D., Giodini S., et al. to be submitted to A&A
- "Direct observational evidence for a large transient galaxy population in groups at $0.85 < z < 1$" Balogh, M. L., et al. 2010, arXiv:1011.5509
- "A Runaway Black Hole in COSMOS: Gravitational Wave or Slingshot Recoil?" Civano, F., et al. 2010, Astrophysical Journal, 717, 209
- "Identifying Dynamically Young Galaxy Groups Via Wide-angle Tail Galaxies: A Case Study in the COSMOS Field at $z = 0.53$" Oklopčić, A., et al. 2010, Astrophysical Journal, 713, 484
- "A Weak Lensing Study of X-ray Groups in the Cosmos Survey: Form and Evolution of the Mass-Luminosity Relation" Leauthaud, A., et al. 2010, Astrophysical Journal , 709, 97
- "The XMM-Newton Wide-Field Survey in the COSMOS Field: Statistical Properties of Clusters of Galaxies" Finoguenov, A., et al. 2007, Astrophysical Journal, 172, 182

Media Activities

- 20.01.2010 Press Release by INAF (Italy) : "Tracce di materia oscura in galassie remote"
- 11.05.2010 Press Release by Max Planck Society (Germany): "Black holes - gas blowers of the Universe"

Scolarships

- IMPRS PhD Scholarship 2007-2010, Max Planck Institut für Extraterrestrische Physik

Hard truth about your CV…

❖ Your CV is more than your list of publications

❖ Your CV is more than your list of scientific skills

❖ Who reads your CV is likely not a scientist

The CV that got me hired

- **Little mention of astro-related content (!)**
- **Focus on skills**
- **More focus on soft skills/personality**
- **Comprehensible tech keywords**

Resume for Stefania Giodini, PhD (Physics)

Kraanstraat 16 3514BE, Utrecht, Netherlands
Phone: +31 06 29125972 ● E-Mail: stefania.giodini@gmail.com
Date of birth: 06 August 1982

Profile

Motivated and proactive personality, creative problem solver with innovative and result driven attitude. Quick at translating new ideas into projects. Experienced at communicating, networking and team working, promoting cooperative work in multicultural environment. Proven ability of meeting deadlines and independent managing of multiple tasks.

Key Experience

- **Numerical modeling** of experimental data and uncertainties: analysis and interpretation of noisy data, predictions for complex systems, modeling of electromagnetic wave signals.
- **Imaging** (X-ray, optical, near-infrared) and imaging analysis (pattern recognition).
- Scientific **programming** (Python, IDL, Mathematica, C) and statistical analysis of large datasets.
- Communicative **mediator** between science teams.
- Familiar with Unix/Linux/Window systems.
- Scientific writing of technical papers, reviews and documentation.
- Coaching of students.
- Referee for international astrophysics journals.
- Business traveling on a regular basis.

Current Position

Postdoctoral Research Associate, Leiden University	2010 - present
Visiting Faculty, University of Maryland Baltimore County, Baltimore, USA	2010 - present

Education

PhD, Astrophysics, Max Planck Institute for Extraterrestrial Physics, Garching, Germany	2007 – 2010
Thesis grade: Summa cum Laude (0.75)	
M.Sc., Astrophysics and Space Physics, cum Laude, University of Milano-Bicocca (Italy)	2004 - 2006
B.Sc., Physics, 110/110 University of Milano-Bicocca (Italy)	2001 - 2004

Languages

Italian: mother tongue
English: fluent (C1) writing and speaking, 5 years daily working experience in scientific English
German: good (B1), I lived 3 years in Germany
Spanish: good understanding (B1), reasonable speaking (A1)
Dutch: beginner level (A1) and motivated to reach working-level

Interests

Classical guitar, team sports, board games, traveling, learning languages.

It's a matter of keywords

Focus on the skill not on the application you used it for:

What your employer will not understand	What your employer will understand
Phase analysis of CMB data from the WMAP satellite	**Signal processing** (applied to e.g satellite data)
Extensions of the NFW profile model…	**Analytical modelling**
MHD-SPH code for cosmological simulations	**Numerical Modelling** (MHD-SPH methods)
Analysis of catalogue of cluster of galaxies…..	**Data science**/ interpretation Familiarity with statistical methods for big data
XX peer review publications….	**Collaborative work** in international environment

Cover Letter

Dear Denise Ekelmans,

with reference to the company webpage I apply for the position of PhD Think Tank advisor (REF: STEP-015).

I have a PhD in Physics, with Astrophysics and Space Science as specialization and I have worked as a Researcher at Leiden University. I left the academic world to be involved with the development of commercial technologies and I am currently employed as Scientist Innovator at TNO in the Acoustics department. In this role I do technical consulting for both Maritime and Offshore companies and the Dutch Government, coordinate projects and conduct research on new technologies.

My strongest point is an analytical mindset combined with creativity and excellent communication skills. I have experience in leading and coordinate teams and projects and I am strongly result oriented. I am proactive and enjoy leading discussions and constructive debates.

I find that working in a company as S[&]T will be an optimal use of my full potential. Especially a think-tank work environment is attractive to me, because both communication and creativity will play central roles in the job.

You will find me creative, ambitious and energetic, and I am confident that my ability, experience and enthusiasm provide the versatility to place me in a number of contexts, meeting the expected level of excellence.
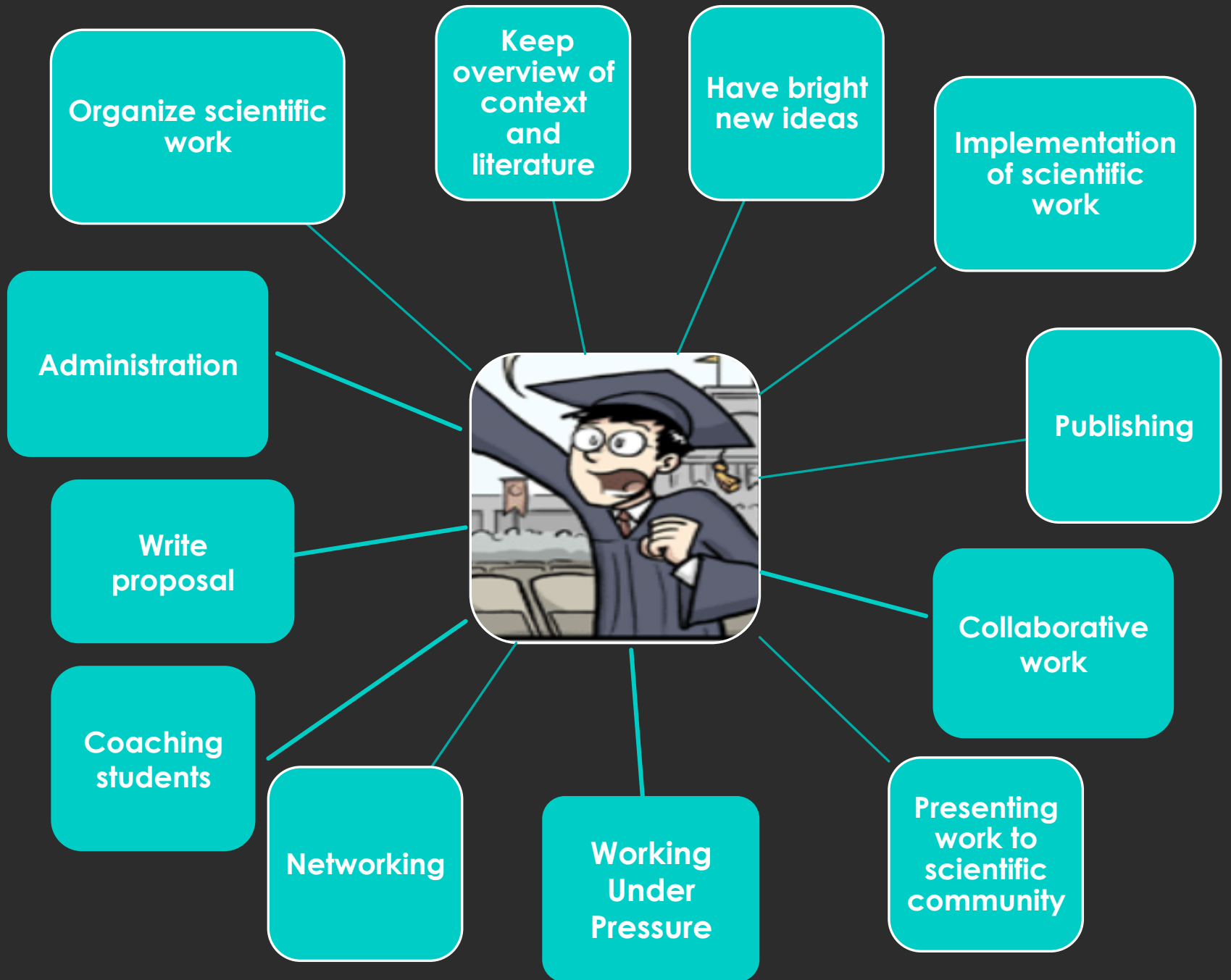
I look forward to speak with you about this opportunity.

- Don't be modest
- Convey enthusiasm

- Explain why your personality will fit in the company/group
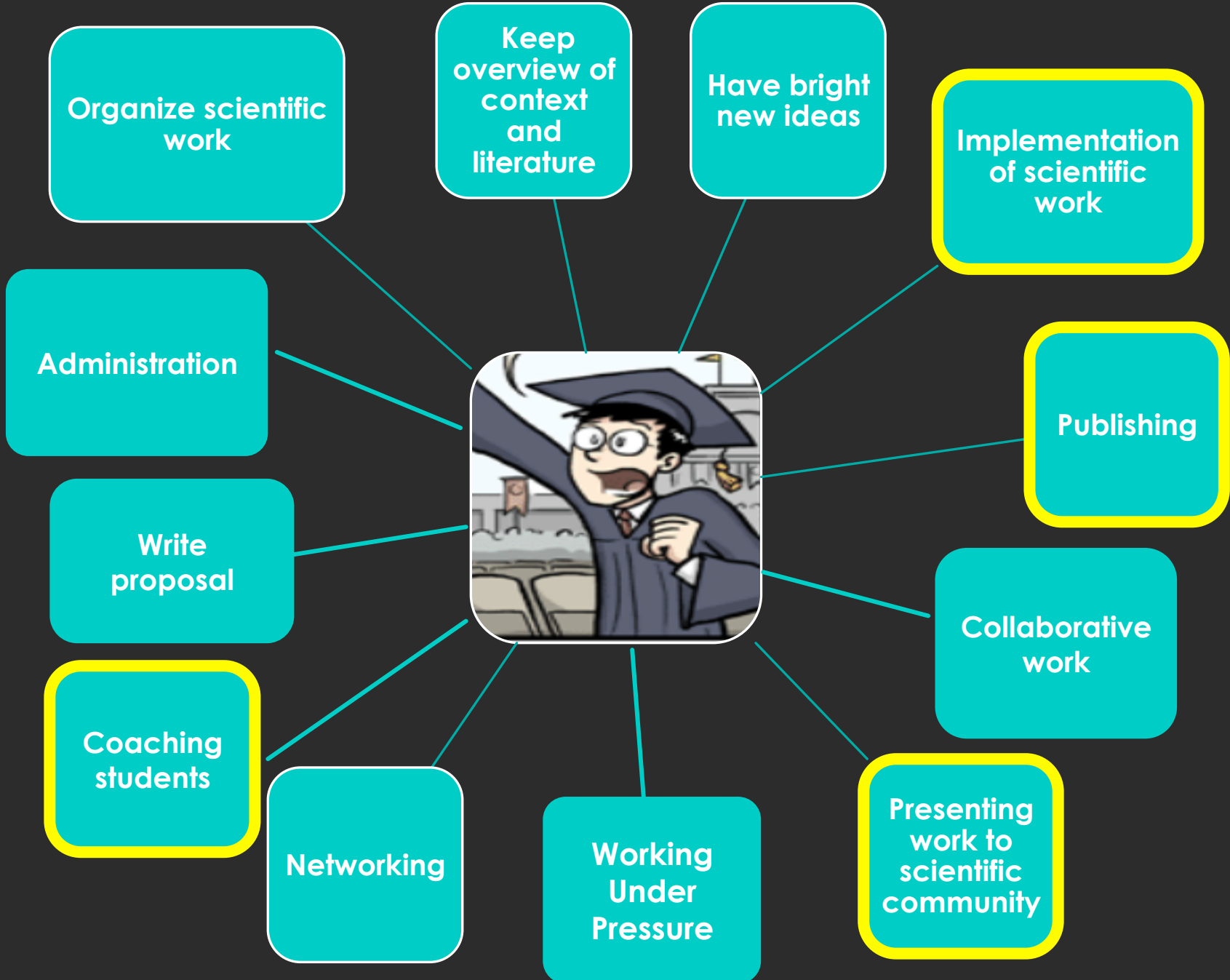- Explain which role you want to take in the company

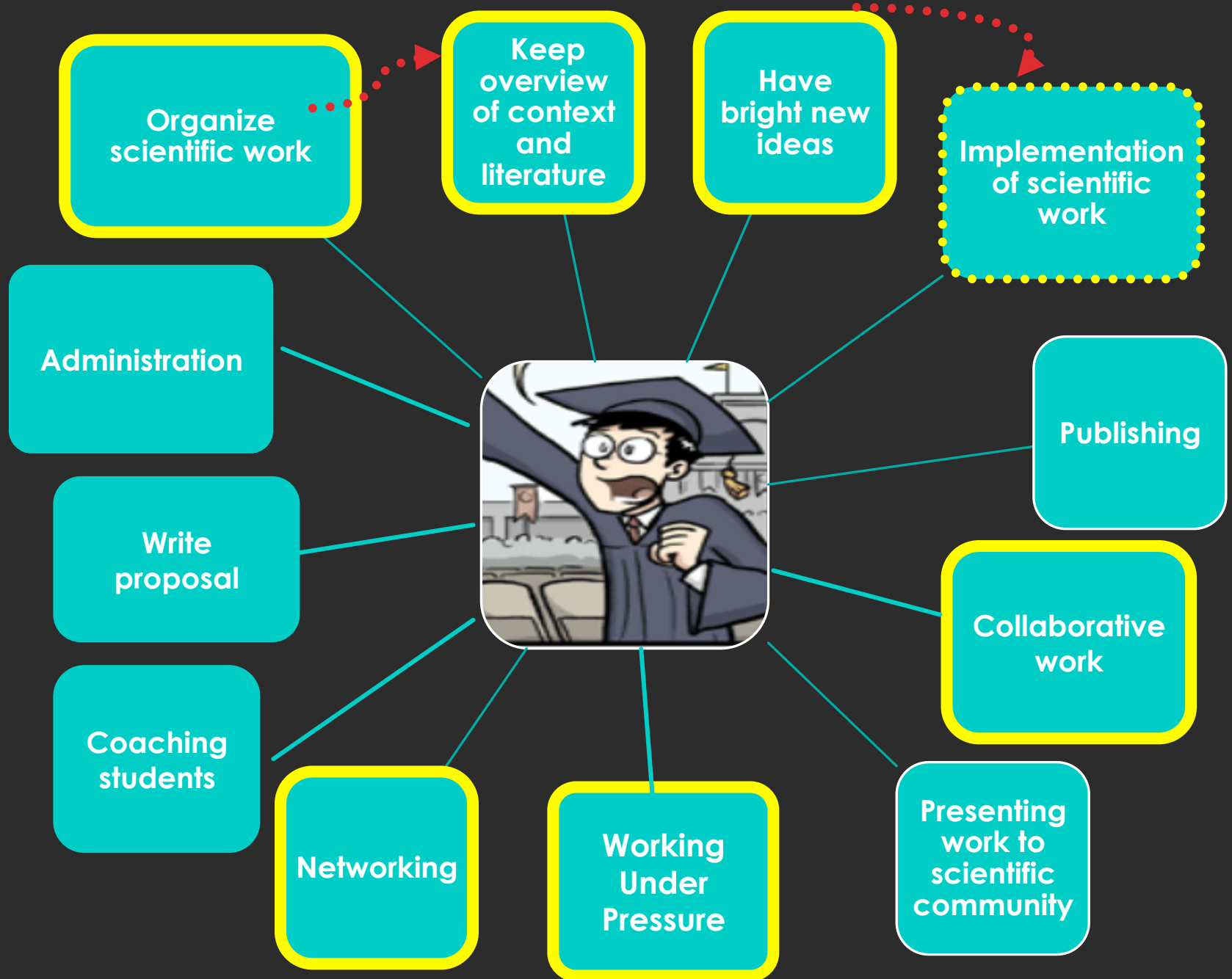**Understanding the skills that you already have**

I FOCUSED ON…

Skill transfer

TECH

Analytica l Modelling   → Sound Propagation Modelling

                                     Sound Source Modelling

Satellite Data Processing → Sonar Data Processing

Statistical Modelling   → Interpretation of results from sonar
                                        detection/classification

Python/IDL coding   → MATLAB coding

Immediate employability

SOFT

Big Picture/Overview   →   System Engineering / Tech Proj Lead

Scientific Writing   →   Technical Writing

Presentation Skills   → Conferences

                               Internal/External Client Presentation

Collaborative Work   → Coordinating Collaborative Work

Ideas/Proposal Writing →   New Project Fund Raising

Working under pressure → Project Coordination

Organizational Skills   →   Project Coordnation

Growth Potential

So…

❖ Focus on the skills not the content of your research

❖ Make sure soft skills are well represented in your CV

❖ Understand beforehand how can you transfer your skills

Proactivity & Creativity

You have a CV: now what?

The standard way:

❖ Online profiles (Linkedin, Monsterboard (NL), etc)

❖ React to job postings

❖ Attend to job fairs and talk to companies

The unconventional (proactive) way:

❖ Unsolicited application **to research managers**

❖ Get in contact with people working there

How does it work

HUMAN RESOURCES

YOUR FUTURE BOSS

YOUR FUTURE COLLAGUES

My job call : Junior scientist Acoustics & Sonar

- **Functie-eisen:** We hebben momenteel plaats voor twee junioren: één met de focus op informatica en software ontwikkeling en één met de focus op akoestiek en sonar(signaalverwerking). Je hebt een afgeronde opleiding informatica met een aantoonbare affiniteit voor akoestiek en sonar of een afgeronde opleiding natuurkunde, werktuigbouwkunde, elektrotechniek of sterrenkunde. Naast inhoudelijke expertise hechten we veel belang aan communicatieve vaardigheden en klant- en resultaatgerichtheid om in teamverband te werken naar een eindresultaat dat bruikbaar en toepasbaar is voor onze klanten.
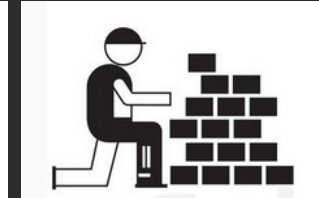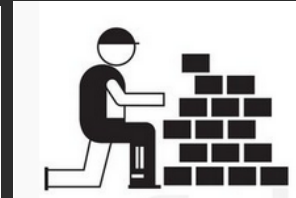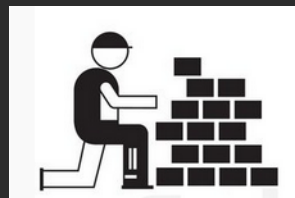
The Interview

Common prejudices (1)

Jobs outside academia are:
- **Boring**
- **Easy**
- **Not scientifically challenging**
- **Not publishable**
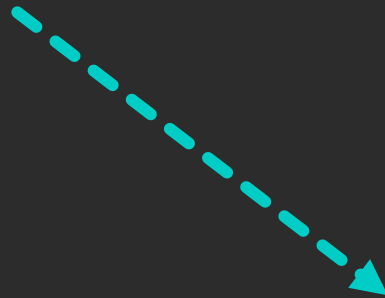- **Signal of a personal failure**

YOU

INDUSTRY

Common prejudices (2)

Who comes from an academic job :
- **Is not efficient**
- **Is too detail oriented**
- **Is not keeping up with deadlines**
- **Is only interested in publications**
- **Will eventually go back to university**

INDUSTRY

YOU

What is the interviewer searching for?

- ❖ Understanding your personality type e.g.
  - ❖ Extrovert/introvert?
  - ❖ Implementer/coordinator/creative?
- ❖ Understanding your fitness in the group/department
- ❖ Understanding your social skills
- ❖ Understanding if you can work efficiently and grow within the company
- ❖ Understand if you will stay in the company or this is a temporary solution
- ❖ Relevant background knowledge

'Tell me about your previous job'

❖ Prepare non-tech version of what you did during your research (3 min)

❖ Do not loose yourself in scientific details

❖ No astro-ph wording

❖ Talk more about **how** you work than **what** you worked on

'In which direction do you want to grow?'

Ask about the possible development lines in the company e.g. in TNO

TECH ROLES			NON TECH ROLES	
SCIENTIST	INTEGRATOR	CONSULTANT	PROJECT MANAGER	BUSINESS DEVELOPER

ASK FOR TRAINING OPTIONS AND BE OPEN FOR ALL POSSIBILITIES!

'Can you work in projects?'

❖ **Your PhD was a project**

❖ Every publication is a well defined collaborative subproject

Main Differences:

❖ A project has well define budget/timeline

❖ A project is done by a **team** with well defined roles

❖ The aim of the project is '**happy project managers/happy clients**'

Transfer your skills to the new job

Immediately transferable skills

- ❖ Put assignment into context, learn the big picture
- ❖ Give a presentation on your previous job and how you intend to use your skills in the present function
- ❖ Network with all new colleagues
- ❖ Quick literature overview of new subject (ask colleagues!)
- ❖ Make plans for your scientific work in a timescale 1-6 months
- ❖ Have regular meetings with your project manager/mentor about direction of your work
- ❖ Ask training courses

Complement your skills : what they don't teach us at university

- ❖ Dare to ask!
- ❖ Dare to tell if you don't know
- ❖ Do not try to impress doing things all by yourself
- ❖ Learn to delegate
- ❖ Working long hours is not a good sign
- ❖ Good is good enough, not perfect

First assignment

- ❖ Dare to ask!

- ❖ Identify who are the experts on the topic and quickly learn from them

- ❖ Be efficient: show your approach and ask feedback asap

- ❖ Write a short presentation/report on what you have done and put your work into context

How this worked out for me

- Hired 2012
- 2012-2013: Worked for sound propagation modelling (sonar, seismic)
- 2012-2016: Written 4 successful internal scientific proposal on use of robotics system (300K)
- 2013: Switched from sound modelling to robotics
- 2013: Training project management (IPMA)
- 2014: Training system engineering
- 2016-2020: Technical project management for muiti-M program autonomous systems for replacing minehunting capabilities
- One of main point of contact for work on autonomy at TNO
- Writing European and H2020 proposals
- Starting Internal Management Training

Take-home points

❖ **Keep an open mind: there is life and interesting jobs out there** ☺

❖ Get a CV that a non-technical person can read

❖ Focus on your skills not on the content

❖ Think about the skills you already have, expecially soft skills

❖ The interview is about understanding who you are and how do you fit

❖ Make a plan for skill transfer in the job you want

Thank you!