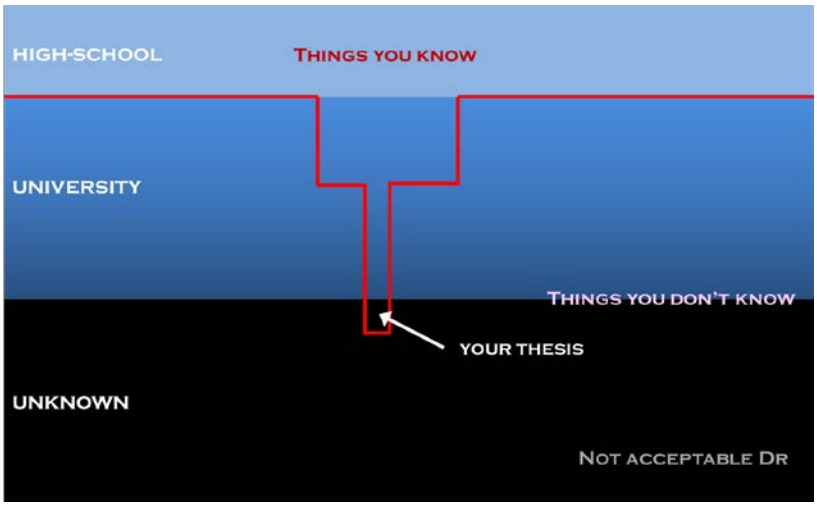
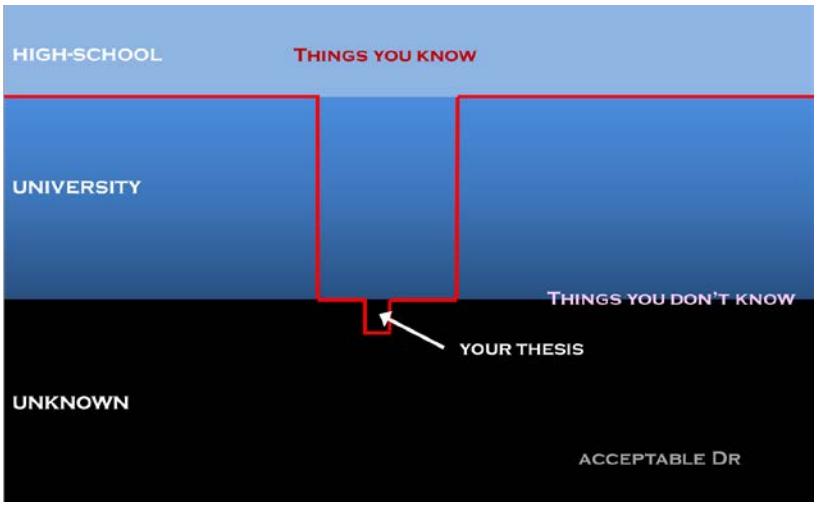
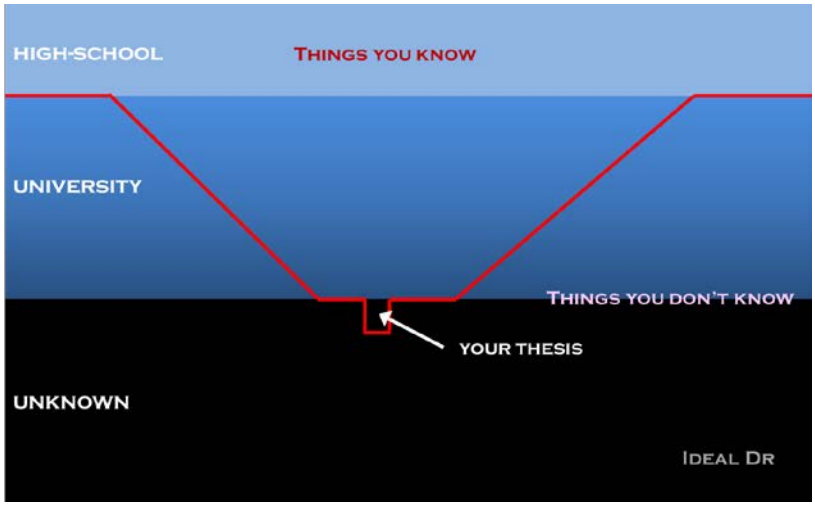
Gunilla Borgefors
Mars 2019

Being a PhD student

First: Remember that you are adults with university degrees that get a salary for doing important research. You are not pupils any longer and should not be treated as such. Nor should you yourself act as a dependent pupil.







University

You are at a *univers*ity, which means you have the whole ocean of knowledge around you. Swim in it!

Do take the time to visit seminars at other divisions, departments and even faculties now and again and put your nose outside your own little hole. This not a waste of time, it is part of your PhD studies and whoever says or thinks otherwise is simply wrong. You will find that most people going to "outside" seminars are professors so: Are they going because they are professors or are they professors because they have always strived for universal knowledge?

Also, ask people you meet in the corridors and coffee rooms what they do.

Supervisors

Your supervisors should be your support, especially in the beginning, but not your dictators.

You should have at least two supervisors at the department, and ideally one outside.

Supervisors should be available on reasonably short notice to discuss anything (related to work).

Having regular meetings both in a group of PhD students and individually is a good idea.

You will also have two senior group of to interact with, at least once a year, preferably more often.

If your project has co-operation or financing from the outside then *you* should be part of those contacts, they should not be only through your supervisor.

You supervisor can be your friend, but it can also be a strictly professional contact.

If you have problems with one of your supervisors, whether it is a lack of time for you or inappropriate behaviour, do not hesitate to react (see last section). You will *not* be thrown out for doing this.

Remember that a supervisor is not a thought-reader. *You* must speak up and take your responsibility for having good and frequent contacts.

Planning

Doctoral work consists of four parts:

Courses
Research
Teaching
Other tasks at or for the division, department, or university

You must have a study plan that must be updated at least once a year. The proscribed format is getting longer and longer. But always remember: it is a *plan* – it can and even should be changed often.

It is natural to do more courses in the beginning, but insist on starting your research from the first month.

Do the obligatory courses early – there may be a waiting list.

Teaching is very developing for you, so try to get a reasonable amount of. It is also a good merit for the future.

Try to get to be the supervisor for at least one Master thesis student.

Give at least one seminar at your division a year, so you get input from the available experts and everybody knows what you are doing. And you get training in doing presentations. Insist in getting your presentations evaluated by good speakers.

Always rehearse a conference presentation by presenting it to a group of people at the department.

Those that have industrial or other paying partners (not VR or similar) will probably feel a pressure from them to *only* do their research. Do not give in to this – you are in a multi-faceted education. Ask your supervisors for help if this is a problem – or even higher up if necessary.

Plan to spend two to six months at another university as a guest scientist. The third year is the ideal time.

Many division tasks are developing for you – but remember to get documentation (if possible).

You should always know rather well what you should do the next 6 months.

You should *not* know in detail what you will do in 18 months (then you are not doing research).

CV

Start you CV from your study plan if you have not yet done so (even more important now when the study plan is so un-CV like). The "master CV" should be *very* detailed. Things to include:

Education including *all* courses

Employment

Teaching – collect certificates and course evaluations

Supervision – bachelor and master theses

All seminars and presentations (including posters) held

Conferences and meetings (also local and "just" participating)

Reviewing – (give conference and journal, not authors)

Visiting scientist (you should go for at least a few months, ideally in the third year)

Research and travel grants you applied for yourself and got

Professional organisations (SSBA…)

Awards

Publications

Tasks done at or for the division, department, or university

Conferences

Try to go to as many conferences as you can. In my view, the department should pay for the first one without you having a paper.

There are many funds that will pay for conference trips if you do have a paper, both at the university and outside. Start collecting information about sources and apply. (Good training writing larger applications!)

Prepare your presentation – if any – very carefully. Note that you often get more interesting interactions with a good poster than with an oral presentation.

Attend most oral and poster sessions – it is not a tourist trip. Do not be afraid of putting questions (politely). It is good for practice and memory to write a conference report on what you found most interesting, and give it to your supervisor – who could/should give some course points for such a report – especially if you also do an oral presentation on the conference for your colleagues.

Bring business cards (UU will print them for you, ask your administrator).

Take as many contacts as you can. Contact people who gave valuable presentations afterwards and start by saying how interesting they were. Do not be afraid of approaching "big names." Even the well-known ones will appreciate your interest!

Dress so your clothes are not noticed – neither black suit nor frayed jeans and T-shirt; neither miniskirt nor party dress.

Men, be aware of how you come across to female scientists at meetings. They are there as scientists, not as sexually available women. Women – do not accept inappropriate behaviour. Say "that's not why I am here" and leave. And in bad cases, report inappropriate behaviour to the conference organizers.

Attend the conference dinner – it is part of building your network. Sit with new people.

Dress appropriately. Many places demand "jacket and tie," so bring that.

Do *not* get drunk. Not at *any* time.

Do not place any of your belongings on the table.

If you are unsure, take a brief course in cutlery.

Give dietary requirements beforehand if possible. Be discreet about problems – but do not sit suffering – everybody wants you to enjoy the meal. Special dishes are always served after the standard one – so you may have to wait (this is to not give other guest ideas about wanting to change).

Do not *only* talk about work.

Reviewing

Reviewing is part of being a scientist. It is rather thankless, but it is developing for you and an ethical must.
Ask your supervisors to help them with their reviews when you have published your first paper. See to it that you get acknowledged.
Conferences usually list reviewers in proceedings.
Journals differ, but you can always ask the publisher for a certificate.

Professional organizations
All subjects have their own professional organisations, national and international.
IEEE is suitable for all at IT – join as student member now!
Find more special organisations (ask your supervisors) and join.
The department will often pay your membership fee (but you have to pay tax on it). Ask for it.
You should join *and* take an interest – go to meetings, offer to do tasks, communicate.
Professional organisations are a very good way of getting useful contacts and accelerating your carrier!

Thesis
First decision is monograph or not. My view is that it is better to publish one more paper during the time it takes to write a monograph. The same goes for the Lic – as long you are aiming for the PhD.
Do not start too late – it takes a lot of time! Make a timeline for the last year.
Make it clear in the thesis what *you* did – especially if there are many authors of the included papers.
Get as many as possible to read it – not only your supervisors. Get people to read as you write.
You need a Swedish summary – this should *not* be popular. You supervisor should be your translator.
Add a summary in your mother tongue too – if not Swedish or English!
A good place for help is: https://www.crisluengo.net/thesis-writing
UU library sometimes gives courses on thesis production
You should have a say on who will be your opponent and in your committee.
...and it is always a good idea to cite the opponent ;-)

Independence

You start your PhD studies as rather dependent on your supervisors, but the goal of your studies are to become an independent researcher with leadership skills. Therefore, you must gradually become independent during your years as PhD students, and not expect independence to come automatically when you have your diploma. Good supervisors are aware of this and help you along the way. But you must also dare to do your part.

Problems

It is not frequent, but sometimes a PhD student may run into problems either with their supervisor(s) or into other problems the supervisors cannot solve and you cannot or should not handle yourself. There is outside help in these cases, and you *should* use it. Locally you can contact either your Division Head or your FUAP (Professor of Research Education). If they are part of the problem or for other reasons you want to go outside your Division you should contact the Director of Research Education at the IT dept., Pierre Flener, Pierre.Flener@it.uu.se. Or any senior that you feel comfortable with. Uppsala student union also have person to contact, if you would like to talk to somebody outside the university. The generic address is: studentombud@us.uu.se.

Scientific work *should be*

1. Possible

A successful scientist works on solvable (but non-trivial) problems

2. Goal driven

Long term (thesis to life work)

what should results be in the (best/probable/worst) case?

Short term (weeks to months)

which partial problems should be worked on at present?

Short term goals should be clear. Long term goals should be the lodestar and the inspiration, but the specific methodology is often unclear or unknown - otherwise it would not be research!

3. Hypothesis driven

First an idea

How should it be proven (maths) or disproved (science)?

First decide what is enough to discard the idea

Then test the idea

Research results *must be*

1. Repeatable *(on the same class of data)*

2. Discriminatory *(different results for different data)*

3. Meaningful *(the result is strongly correlated to an interesting property)*

4. Predictive *(if applied to this class of data or in this situation, this will happen)*

The Scientist *should be*

Dissatisfied

Creative

Sceptical

Honest

Independent

Optimistic

Questioning

Resourceful

Collaborative

Idealistic

but most of all Stubborn

... and remember to change the perspective occasionally!

Why the Zapf Chancery type? Because it has been scientifically proven that slowing down reading by using a "difficult" font make you remember more of what you read!

Some books that generated new thoughts on

Life, the Universe and Everything

- Lucretius, T. Cari: De Rerum Natura [On the Nature of the Universe] (55)
  (to remember that we stand on the shoulders of the old Greeks)
- Hofstadter, Douglas R.: Gödel, Escher, Bach: An Eternal Golden Braid (1979)
  (why AI solves all problems and the Turtle is a holist)
- Hofstadter, Douglas R.: Metamagical Themas: Questing for the Essence of Mind and Pattern (1985)
  (why AI solves no problems and Achilles is a reductionist)
- Garwood, Christine: Flat Earth: The History of an Infamous Idea (2008)
  (how old ideas remain despite overwhelming evidence and the apparently hopeless struggle against pseudo-science)
- Gould, Stephen Jay: Wonderful Life: The Burgess Shale and the Nature of History (1989)
  (on the power of randomness in the in general and in evolution in particular and about slaughtering herds of sacred evolutionary cows)
- Godfrey-Smith, Peter: Other Minds – the octopus and the evolution of intelligent life (2017)
  (that shows that alien intelligence is found here on Earth - the last common ancestor of octopi and vertebra 700 million years ago might have had neuron-ish cells but not a nervous system!)
- Pepperberg, Irene M.: Alex & Me – how a scientist and a parrot discovered a hidden world of animal intelligence (2008)
  (if you never ask a question because you know it will not get an answer – then you would miss talking to parrots and learning new things)
- Pääbo, Svante: Neanderthal Man - In search of lost genomes (2015)
  (on how obsessed and persistent you have to be in your research to succeed)
- Diamond, Jared: Guns, Germs, and Steel: A Short History of Everybody for the Last 13,000 Years (1997)
  (explains why Nobel prize winners are Euro-Asians not New Guinea natives even though the latter are more intelligent on average)
- Finkel, Irving: The Ark before Noa – decoding the story of the flood (2014)
  (were you learn that pieces of the ark was sold as souvenirs long before the bible versions(!) of the story were written, how it would have looked, and why it is a fantasy)
- Ferguson, Kitty: Tycho and Kepler: The unlikely partnership that forever changed our understanding of the heavens (2002)
  (about the triumph of the heliocentric theory and why Kepler – differently from Galileo – never had problems with the inquisition (except when he saved his grandmother from being burned as a witch))
- Wootton, David: Bad Medicine: Doctors doing harm since Hippocrates (2006)
  (why doctors ignored new scientific results for centuries, which made it more dangerous to consult a doctor until 1865 and meaningless until the 1930s)
- Sokal, Alan D.:The Sokal Hoax: The Sham That Shook the Academy (2000)
  (the proof that apparently serious scientific journals can publish total crap – if well written. And the following attempts at whitewashing from the editors.)
- Hardy, G. H.: A Mathematician's Apology (1940)
  (a both naive and insightful description of the life of a scientist before Project Manhattan)
- Hitchens, Christopher: The Missionary Position: Mother Teresa in Theory and Practice (1995)
  (about a modern myth and what happens when bad conscience make people blind)
- Machiavelli, Niccoló: The Prince (1514)
  (about the art of politics and how to avoid its consequences by recognizing the methods)
- Bramson, Robert M.: Coping with Difficult People (1981)
  (because scientists are...)
- Ehrenreich, Barbara: Smile or Die (2009)
  (about the dangers to society and organisations that only accepts optimistic, smiling yes-men (and -women))
- Solnit, Rebecca: Men Explain Things to Me – and other essays (2014)
  (why you are not the only female scientist having your own work explained to you by an intellectually challenged man and other irritations on the professional woman's way)

- Deutscher, Guy: Through the Language Glass – why the world looks different in other languages (2010)
  (our mother tongue does influence how we see the world - but not how complex thoughts we can have)
- Truss, Lynne: Eats, Shoots & Leaves (2003)
  (a book about English (and American) punctuation that was the unlikely winner of "Book of the Year 2004" in the U.K. – people do care about apostrophes and commas)
- Foster, Don: Author unknown – on the trail on Anonymous (2000)
  (if you want to know who the evil reviewer of your paper is you get the methods here – nobody is "Anonymous" for the language detective. Even more so now than when the book was written)
- Kalder, Daniel: Lost Cosmonaut (2006)
  (about how fun it is to travel to the most boring places you can think of and find yourself there – travels to four European capitals you have never heard of)
- William Shakespeare: MacBeth (≈1600)
  (because Billy must appear in every book list and "The Scottish Play" because it warns about believing apparently positive predictions from uncertain sources – even if they happen to be true.)

Suggested by Gunilla Borgefors

20190319

Gunilla Borgefors
Mars 2019

Where to publish?

IT is unusual as we publish both in international scientific journals *and* in fully reviewed conference proceedings. General university bibliometrics does not count proceedings at all. We should be aware of this, but not change our publication habits. Just point out as often as we can that our publication habits *are* different.

There are many quality measures of a journal or conference. Here, I list all conferences and journals the students will present, together with one or two corresponding quality measures.

The most common quality measure for journals is the 2-year impact factor, **if-2**, as computed by ISI Web of knowledge,
http://admin-apps.webofknowledge.com/JCR/
The impact factor is computed in a complicated way, but essentially it is the average number of citations a paper published in the journal gets during its two first years. They also give the 5-year impact factor, **if-5**, which is the one given here, as it is slightly better. Essentially **if** measures how many *bad* papers a journal accepts.

Another measure in the 5-year h-index, **h-5**, as computed by Google Scholar,
http://scholar.google.se/citations?view_op=top_venues&hl=en
The h-index first orders all papers published during last five years according to number of citations (not only counting journal citations as ISI does). The number where the order number and the citation number is the same is the h-index. Thus, if there are 50 papers with at least 50 citations each, then the h-index is 50. This measure is also available for most quality conferences. Essentially **h-5** measures how many *good* papers are accepted. The seven top journals in the world are (which if-5 in parenthesis):

Nature	362	(45.0)
NEJM	358	(67.5)
Science	345	(40.6)
The Lancet	278	(52.7)
Chemical Society reviews	256	(41.3)
Cell	244	(33.8)
Nature communications	240	(13.7)

The h-index is also popular for ranking scientists, listing their whole oeuvre. I consider this the revenge of the mediocre against excellence. Five ground-breaking, fantastic papers with 10000 citations each will give you h=5, but 30 forgettable articles with 30 citations each will give you h=30. With today's one-digit quality measure mania the latter will probably get the academic position...

Another scientist measure you sometimes see is **i10**, which is the number of published papers with at least ten citations.

There is also the "Erdös number" for people in the mathematical sphere. If you published with Erdös the number is 1. If you published with someone who published with Erdös it is 2. And so on. Physicists use the "Einstein number". Movie enthusiasts talk about the "Bacon number" (as in Kevin Bacon). You can check the Erdös/Einstein numbers for anybody at http://www.ams.org/mathscinet/collaborationDistance.html
(Of course there is also the Erdös-Bacon number. The hard-to-beat record holder is Daniel Kleitman with 1+2=3.)

Journals ITFM 2019

Name	if-5	h-5	presenter
IEEE T. on Image Processing	5.85	101	Gupta
IEEE T. on Pattern Analysis & Machine Intelligence	13.23	118	Andersson
Int. J. on Document Analysis and Recognition	1.45	20	Heil
J. of Microscopy	2.13	29	Wieslander
Nature Methods	41.93	156	Partel
(Nature) Scientific Reports	4.61	151	Solozano
Pattern Recognition	4.34	74	Öfverstedt
Pattern Recognition Letters	2.35	51	Wetzer

Conferences ITFM 2019

Name	h-5	
HRI-ACM/IEEE Int. Conf. on Human-Robot Interaction	35	Barajas
CCS-ACM Symp. on Computer and Communications Security	77	Hylamia
ECCV-European Conf. on Computer Vision	104	Bernander
ICCV-Int. Conf. on Computer Vision	124	Koriakina
NeurIPS-Ann. Conf. on Neural Inf. Processing Systems	18	Pielawski

Choosing a journal (but see Plan S later!)

There are a number of criteria when choosing a journal:

1. Your references. If you have several to the same journal, that is probably a good choice.
2. List of subjects the journal covers according to its home page compared to your keywords.
3. Journal reputation, as perceived by your supervisor and colleagues.
4. Editorial board, that is Editor-in-Chief and handling Editors – are they "known" names? Are they from all over the world or just a single geographical area?
5. Journal quality as given by *h-index* and *if*. Choose the right level for your paper.
6. Beware of the many new open access journals with no merits whatsoever (predatory publishing)!

Choosing a conference

Choosing a conference is more difficult, as there are more factors to take into account. The ones for journals are of course also relevant, but there are many "bad" conferences.

Conference quality levels

1. Review of full paper by at least two persons. At least 30% reject.
   => as good as journal (at least)
2. Review of abstract (1-2 pages) with small reject fraction (e.g. SPIE). Can be OK, but
   => will not be counted very high
3. No review - "all welcome" (this is common for non-IT conferences!)
   => same as internal report

Proceedings levels

1. Published by big publisher and available on the net (Springer Lecture Notes, IEEExplore)
2. Published with ISBN number
3. Local publication – e.g., university report
4. No "open" proceedings – only participants get paper or USB proceedings (SSBA)
5. Only abstracts or nothing published

(Don't waste good papers on levels 3-5!)

Oral or Poster presentation

- At many conferences these are counted as of equal quality
  => no difference in proceedings
- At some conferences posters are "marginal papers"
  => posters get less or no space in proceedings. WARNING!
- At some conferences anybody can put up a poster.
  => can be good for getting contacts, but has no publication value.

(NOTE: If poster sessions are well organized, you get more interesting contacts that way!)

Other factors to consider

Can you get important contacts?
Is it an important meeting for your co-operation partners?
Are the invited speakers interesting?
Are there well-known scientists in the committees?
Is anyone from our department involved?
Is your paper good or marginal?
Cost of attending?
What do your supervisors think?

In all cases – *beware of putting your submitted papers online anywhere* – many journals and conferences then consider them published and will reject them without review! An exception is arXiv – but you have to note the submission in arXiv *and* tell the journal about it. And remove it if accepted.

Plan S

Today UU libraries pay about 60 million SEK for digital access to most scientific journals (but no longer Elsevier). Journals make a profit of 30-35% - much more than mist businesses.

Plan S is an EU initiative to make all scientific publications freely available, a.k.a. "open access". So far, 15 research funders insists that from 2020 all publications that they fund, in whole or in part, must be immediately available. Note that Plan S is for *all* publications, both Journals and Proceedings. More funders are expected to follow – at least in Europe and North America. If globally implemented, this will completely change scientific publishing for the better. If only locally implemented, it will severely handicap affected scientists. The period of change will probably be messy. And more expensive to Universities than either today or when global.

Today's journals and proceedings come in several classes (or a mix):

1. Journals that always keep papers within payment walls
2. Journals that keep papers within payment walls for a time (1-2 years) and then release them
3. Journals that keep papers within payment walls but allows publication in open archives (e.g. Diva)
4. Journals that keep papers within payment walls unless you pay for open access
5. Open access journals without or with minimal payment – *Beware!*

With Plan S, the scientist will have to pay for publication from their project money. (Publication is never free!) The amount is significant. If I understand correctly, FORMAS who has adopted Plan S, includes publication money enough for one publication on a three-year grant.

Ten principles of Plan S

1. authors should retain copyright of their publications, which must be published under an open license such as Creative Commons;
2. the members of the (Plan S) coalition should establish robust criteria and requirements for compliant open access journals and platforms;
3. they should also provide incentives for the creation of compliant open access journals and platforms if they do not yet exist;
4. publication fees should be covered by the funders or universities, not individual researchers; it is acknowledged that all scientists should be able to publish their work Open Access even if their institutions have limited means;
5. such publication fees should be standardized and capped;
6. universities, research organizations, and libraries should align their policies and strategies;
7. for books and monographs, the timeline may be extended beyond 2020;
8. open archives and repositories are acknowledged for their importance;
9. hybrid open-access journals are not compliant with the key principle;
10. members of the coalition should monitor and sanction non-compliance.

Problems with Plan S

- "unfair" and "a serious violation of academic freedom"
- it will bar publication in hybrid journals [subscription journals that make some content open/have an embargo time] restricting researchers from publishing in more than 80% of top journals (including Science, Nature, IEEE) *(and most reviewed conferences – my addition)*
- Can a European initiative like Plan S be strong enough to make publishers globally "flip" their business model?
- The publishers that will thrive under Plan S are those with big economies that publish a high volume of papers. Also, as they make money on each individual manuscript, the temptation will be to publish as many submitted papers as possible *(cf. "holiday" conferences).*
- Plan S will harm scientific society publishers even more than commercial publishers and drive more societies to seek publishing agreements with commercial publishers.

However, we have little choice, and the coming years will not be a good time to publish whichever way Plan S goes.

Gunilla Borgefors
Mars 2019

Journal or Proceedings investigation, Itfm 2019

Every participant will investigate a scientific journal or a conference proceeding.
If you have a journal (J), your material consists of the six latest consecutive issues that are available.
If you have proceedings (P), your material is the proceedings of the latest conference in the series.

You should investigate the general contents, character, and quality of the J/P. In addition you should chose two interesting articles for further study. The results of your investigation should be presented to the participants in a seminar and a short written report. Your two selected articles should be sent out to the other participants and me no later than one week before your oral presentation. Of course you should use what you learned during the course for the presentations.

Written report
Two A4 pages in font Times 10, (see template) containing
- statistics on the subject areas and author groups in the J/P
- statistics on article length and time to publication from submission
- information on acceptance rate and impact factors
- open access always or can be payed for

Do not forget that *all* written reports and papers should contain your name and the date.

Oral presentation
You should give an oral presentation, containing the information in the written report together with presentations of the two selected papers. The time is 20 minutes exactly! (Not 19 minutes, nor 21 minutes.) This is a challenge, especially since you have too much to present. This is deliberate, as this is almost always the situation when presenting at conferences and elsewhere.

After each presentation there will be a question-and-answer session where everybody is expected to participate. All participants should have looked at the two papers beforehand and put at least one question.

As active participation is the examination for this course, those who are absent or inactive during more than one presentation lecture will get extra tasks.

Hopefully, this investigation task will become easier after the first five lectures.

Ankit Gupta	J	IEEE Trans. on Image Processing (TIP)
Axel Andersson	J	IEEE Trans. on Pattern Analysis and Macine Intelligence (PAMI)
Elisabeth Wetzer	J	Pattern Recognition Letters (PRL)
Gabriele Partel	J	Nature Methods
Håkan Wieslander	J	Journal of Microscopy
Johan Öfverstedt	J	Pattern Recognition
Karl B-son Bernander	P	European Conference on Computer Vision (ECCV)
Leslie Solorzano	J	(Nature) Scientific Reports
Nadezhda Koriakina	P	International Conference on Computer Vision (ICCV)
Natalia Calvo Barajas	P	ACM/IEEE International Conference on Human-Robot Interaction (HRI)
Nicolas Pielawski	P	Annual Conf. on Neural Information Processing Systems (NeurIPS)
Raphaela Heil	J	International Journal on Document Analysis and Recognition (IJDAR)
Sam Hylamia	P	ACM Conference on Computer and Communications Security (CCS)

Your name
Date

Journal title
publisher

Here starts the text…