

INFO5993 / INFO4990 IT RESEARCH METHODS

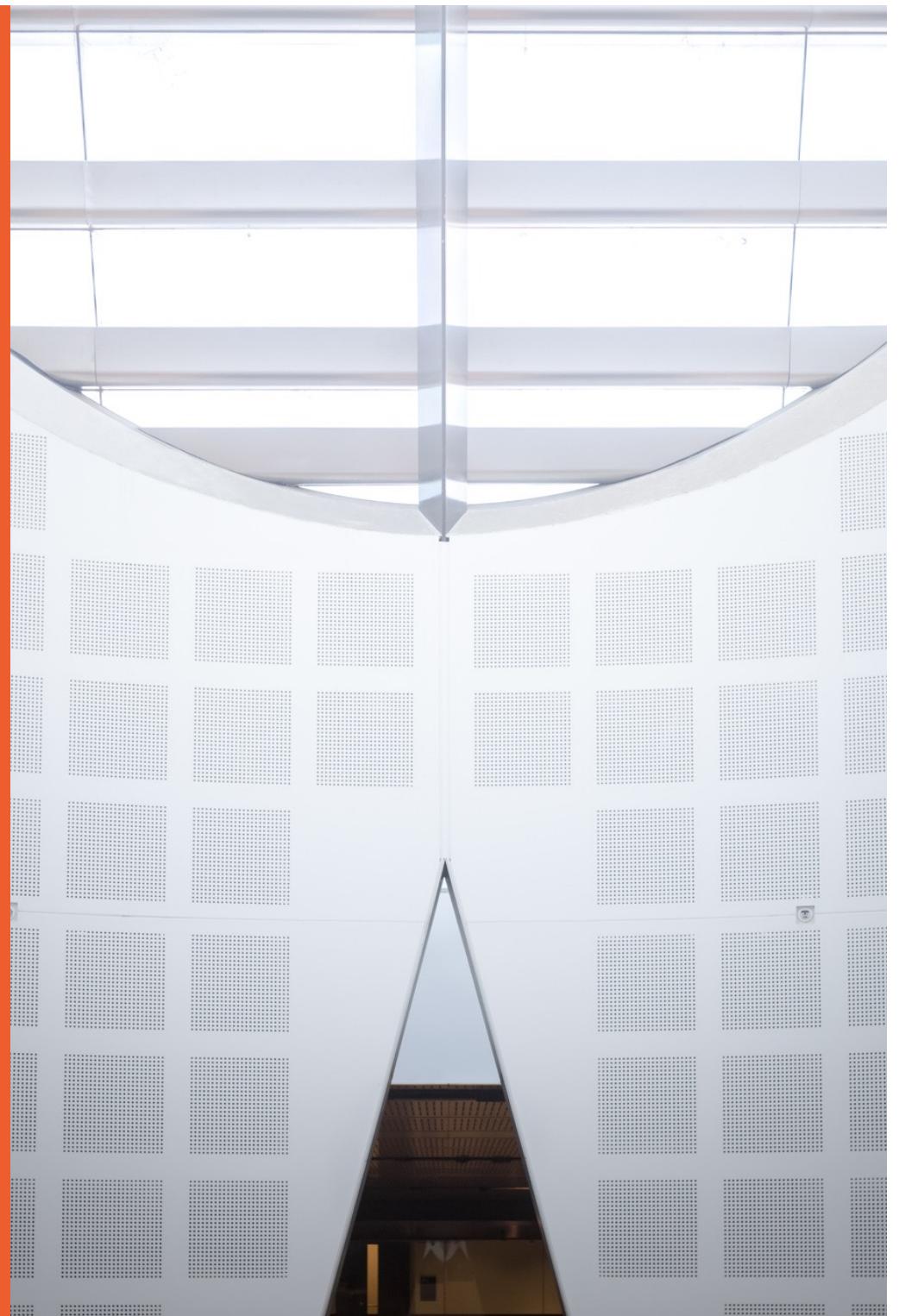
**Week 2: Administravia and
Research Overview**

Kalina Yacef

School of Computer Science



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Acknowledgement of Country

We acknowledge the tradition of custodianship and law of the Country on which the University of Sydney campuses stand, the land of the Gadigal people of the Eora Nation.

We pay our respects to those who have cared and continue to care for Country.

Agenda

- Administravia
 - People & places
 - Expectations
 - Assessment
 - Policies
 - Workplace Health and Safety
 - General Advice and where to get Assistance
- Research
 - Definition, key components, process
 - Finding/refining Research topics
 - You and your supervisor
 - Literature

People

- Coordinator : Kalina Yacef
- Lectures given by a variety of staff (coordinator, CS academics, Learning Hub staff, and in the last 4 weeks 2 additional facilitators)
- Students in this course:
 - PhD, MPhil
 - Honours (18cp)
 - MIT/MITM taking research path
- This course is meant to support your research
 - ONLY for research students starting this semester a CS research project in the school
 - Who is your research supervisor ? Fill out this [short form](#) by Friday 3 March

Places

- Course web page on Canvas
- Lecture: Monday, 2-4pm, **@ ABS Case Study Lecture Theatre 2090 and zoom (for RE enrolment mode)**
 - The last 4 weeks we will be using 2 other rooms for parallel sessions, to be advised
- Lab: No
- Contact via Canvas
- Do not miss class, except for illness, emergencies, etc.
- Get help from Kalina and your supervisors if you feel you are falling behind

Assessment

A1 (15%) due week 5 (marked by supervisor)

Identifying your community

Database search

Identifying Research Problems/Questions

Creating an Annotated Bibliography

A2 (35%) : have a draft ready for class on week 9, assignment due week 10 (marked by supervisor)

Literature Review (30%)

Outline of Research (5%)

A3 (50%) due week 10-13 (marked by coordinators)

– Oral presentation about your research (35%)

– Peer reviewing (15%)

– No final exam during exam period

Assignment 3 acts as your exam

- Presentation + 3 peer reviews
- Worth 50% of the unit
- School of CS policy: you must get at least 40% of the marks available on the exam, in order to pass the unit
 - you must score at least 20/50 marks in A3 to pass the course.

Resources

Canvas Course webpage

- Copies of slides, lecture recordings
 - Official schedule
 - Assignment instructions
 - Your grades
 - External resources
-
- Coordinator, supervisors, staff members involved

Expectations

- Students attend scheduled classes
 - doing assessments
 - preparing and reviewing for classes
 - revising and integrating the ideas
 - practice and self-assess
- Students are responsible learners
 - Participate in classes, constructively
 - Respect for one another (criticise ideas, not people)
 - Humility: none of us knows it all; each of us knows valuable things
 - Check course webpage & eLearning site at least once a week!
 - Notify academics whenever there are difficulties
- Expected ~6-10 hours a week self-study (which all go towards your research !)

Course Topics Overview

- Introduction to research
 - Types of research publications, quality metrics
 - How to search the literature and manage your bibliography
 - Writing a literature review and thesis research proposal
 - Research methods in CS/IS
 - Inc. Experimental CS, Systems research, AI research, Statistical evaluation, HCI research
 - Ethical research
 - Commercialisation
-
- **Mini-conference: Student presentations and peer reviewing**

Special Consideration (University policy)

- If your performance on assessments is affected by illness or misadventure
- Follow proper bureaucratic procedures
 - Have professional practitioner sign special USyd form
 - Submit application for special consideration online, upload scans
 - Note you have only a quite short deadline for applying
 - http://sydney.edu.au/current_students/special_consideration/
- Also, notify coordinator by email as soon as *anything begins to go wrong*
 - Simple extension of up to 5 days may be granted
- There is a similar process if you need special arrangements eg for religious observance, sport representative.

Late assessments

- Unless you have been granted special consideration or arrangements, work handed in after the deadline will incur:
 - A1 and A2: A penalty of 5% of the available marks, per day (or part of) late, up to 7 days maximum. Beyond this you will receive 0.
 - *Eg your work would have scored 60% and is 1 hour late*
 - you get 55%
 - *Eg your work would have scored 70% and is 28 hours late*
 - you get 60%
 - **A3: No lateness allowed.** You must present at your designated time or will receive 0. **If you have a misadventure inform Kalina ASAP.**

Academic integrity

- Academic integrity refers to behaving honestly, ethically and responsibly in relation to all elements of your study at the university, including assessments.
- Always submit your own work, sit your own tests, and take your own examinations.
- Acknowledge any contributions in your assignment which are not your original thoughts, ideas or words.
- Academic Honesty Education Module – all commencing students must complete by census date. Continuing students can self-enrol at any time.
- Lecture on Research Ethics

Strategies for maintaining academic integrity



Planning and time management



Use citations and referencing



Know your strengths and what you need to develop



Know when and where to ask for help



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What is academic dishonesty?

The following are some behaviours that are academically dishonest:

- **Plagiarism** (this is the most common form)
- **Collusion** or illegitimate co-operation
- **Recycling** (using your own work from previous assessments)
- **Cheating**, including **contract cheating**
 - sharing questions or accessing solutions on online “help sites”
 - receiving coaching from a private tutoring company on how to complete an assignment
 - asking someone else to write your assignment (for payment or not)
- **Exam cheating** (using prohibited materials, working with others)
- **Fabrication** or falsification of sources, data or results

What are the consequences?

- The University has strong mechanisms for detection of potential academic dishonesty.
- Suspected breaches are reported to the faculty educational integrity team for investigation.
- The University is deeply committed to ensuring the integrity of its educational programs and treats integrity breaches seriously. As a result, the **academic consequences** for cheating are numerous.
- You may:
 - need to resubmit a task with a mark penalty or
 - receive a 0 for the assessment or even the unit of study
 - be suspended or even excluded from your studies for serious misconduct

Understanding contract cheating

Commercial cheating services are **ILLEGAL** in Australia. Illegal cheating services offer to:

- Sell you essays, assignments, study notes or exams
- Ask you to upload previous work from your course
- Sit exams on your behalf

If you use cheating services, you can face disciplinary action in accordance with USYD's policies. Resulting action can include:

- Failing the unit of study or course
- Suspension or exclusion from your studies
- Losing your professional accreditation
- Being blackmailed by cheating service operators
- For international students, losing your visa

Be aware of illegitimate services

- Be aware of any services that are not affiliated with the University.
- In the online environment, malicious organisations masquerading as 'online help sites and platforms' are preying on students.
 - These organisations may pressure you to pay for online assistance, then turn to **blackmail** when you change your mind.
 - Essays or solutions bought from the internet are usually **poor quality**, badly written and often **wrong**.
 - You won't acquire the skills and knowledge required for your degree, making it difficult to complete further assessments



As a student, you can contact the [Office of Educational Integrity](#) to report something anonymously or seek advice.



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Support services



The Office of Educational Integrity

- Report anonymously or seek advice: educational.integrity@sydney.edu.au

Learning Hub

- The [Learning Hub \(Academic Language and Learning\)](#) offers workshops, online resources and individual consultations on study and writing skills.
- The [Learning Hub \(Mathematics\)](#) offers bridging courses, drop-in services and online resources.

Library

- Check out the [Library's](#) online resources and [referencing and citation styles](#).
- You can also chat with a [Peer Learning Advisor](#) about your studies, including referencing questions

Counselling and mental health support

- The University's [Counselling and Psychological Services](#) provide self and time-management workshops and online resources.

Special Arrangements and Consideration

- [Apply for special consideration](#) if impacted by short-term illness or misadventure

Disability Services

- Register for [Disability Support](#)

Student organisations

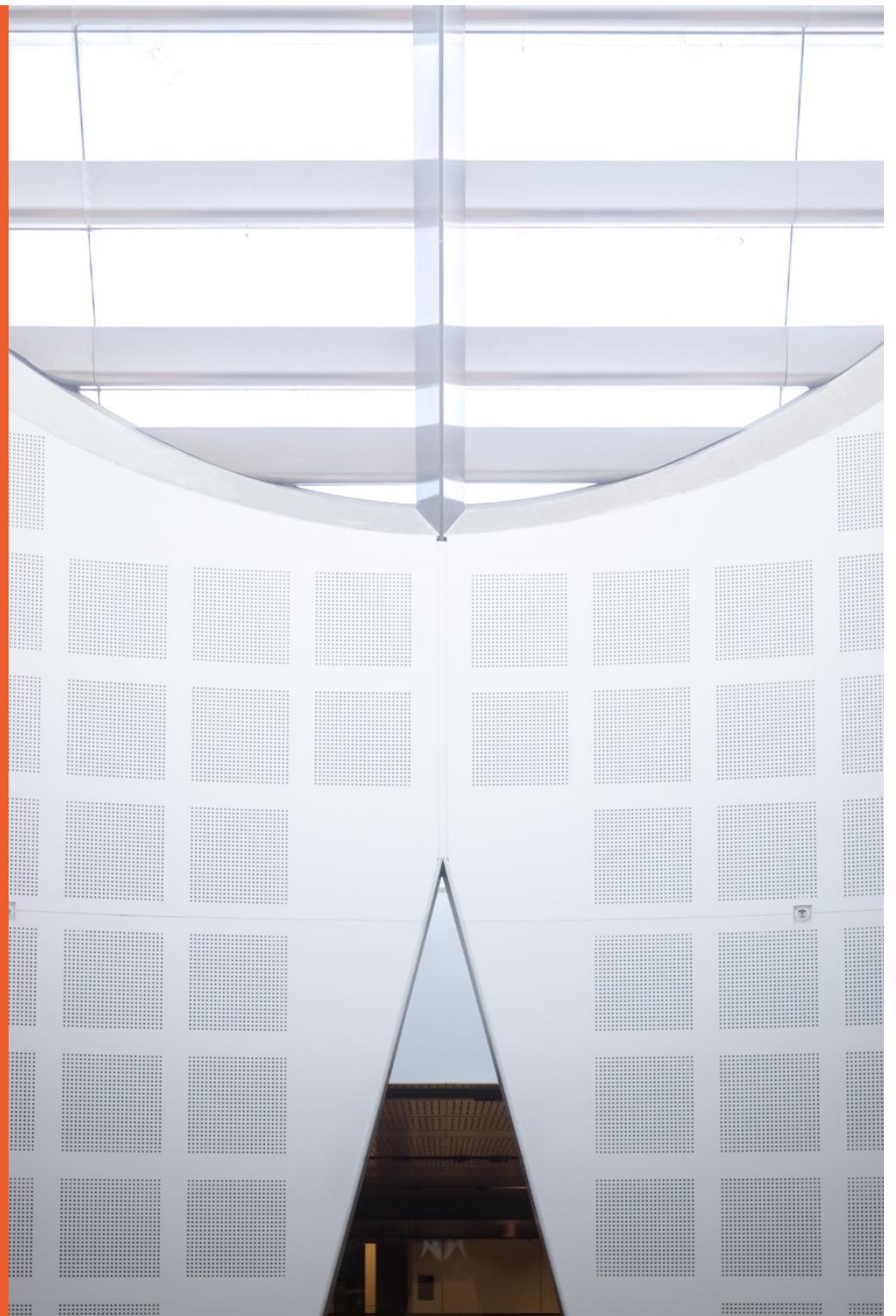
- [SRC](#) (undergraduate students)
- [SUPRA](#) (postgraduate students)

WHS Induction

School of Computer Science



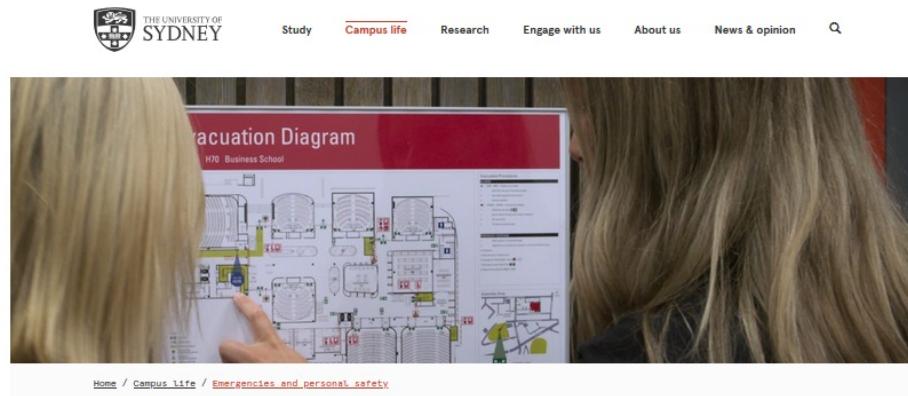
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EMERGENCIES – Be prepared



<https://sydney.edu.au/campus-life/safety-security.html>



[Home](#) / [Campus life](#) / [Emergencies and personal safety](#)

← Home

← Campus life

Accommodation

What's on

Health, wellbeing
and success

Clubs and societies

Getting to campus

Sports and fitness

Food, shops and bars

Emergencies and
personal safety

Maps and locations

Life in Sydney

University_

Emergencies and personal safety

Procedures to follow in the case of an emergency

We're committed to keeping our students, staff and visitors safe.

Emergencies can occur at any time for a variety of reasons. Be prepared to respond independently, particularly if working after hours. Watch our [video on emergency procedures](#) and read our [tips for staying safe on campus](#).

In an emergency

1. Dial triple zero (000)

2. Call Campus Security on 9351 3333

Counselling, support and reporting services

If you have witnessed or been involved in a critical incident, whether on or off campus, and would like to talk to a counsellor:

Students should contact the University's [Counselling and Psychological Services](#) on 8627 8433 or 8627 8437 (9am to 5pm, Monday to Friday).

Share



Safer communities on campus

Our commitment to building a safer campus



Emergency alerts

Find out about our system



EMERGENCIES

Evacuation Procedures

ALARMS

 **BEEP...BEEP...** - Prepare to evacuate

1. Check for any sign of immediate danger
2. Shut down equipment & processes
3. Collect any nearby personal items

 **WHOOP...WHOOP...** - Evacuate the building

1. Follow the Exit signs 
2. Escort visitors & those who require assistance
3. Do not use the lifts
4. Proceed to the Assembly Area 

EMERGENCY RESPONSE

1. Warn anyone in immediate danger
2. Fight the fire or contain the emergency, if safe & trained to do so

If necessary...

3. Close the door, if safe to do so
4. Activate the '**Emergency Call Point (White)**'  or the '**Manual Call Point (Red)**' 
5. Evacuate via your closest safe exit 
6. Report the emergency to 0-000 & 9351 3333 

MEDICAL EMERGENCY

- If a person is seriously ill/injured:

1. **call an ambulance 0-000**

2. **notify the closest Nominated First Aid Officer**

If unconscious— send for Automated External Defibrillator (AED)
AED locations.

NEAREST to CS Building (J12)

- Electrical Engineering Building, L2 (ground) near lifts
- Seymour Centre, left of box office
- Carried by all Security Patrol vehicles

3. **call Security - 9351-3333**

4. **Facilitate the arrival of Ambulance Staff (via Security)**



Nearest Medical Facility

University Health Service in Level 3, Wentworth Building

First Aid kit – SIT Building (J12)

kitchen area adjacent to Lab 110

School of Computer Science Safety Contacts

CHIEF WARDEN

Greg Ryan
Level 1W 103
9351 4360
0411 406 322



FIRST AID OFFICERS



Julia Ashworth
Level 5W
8627 9058



Will Calleja
Level 1W 103
9036 9706
0422 001 964



Cecille Faraizi
Level 2E 237
9351 6060

**Orally REPORT all
INCIDENTS
& HAZARDS
to your SUPERVISOR**

OR

Undergraduates: Xiaofei Liu
8627 6488

Postgraduates HDR: Cecill Faraizi
9351 6060

Postgraduates CW: Keiko Narushima
8627 0872

CS SchoolManager: Priyanka Magotra
8627 4295

Assistance

- There are a wide range of support services available for students: <https://sydney.edu.au/campus-life/health-wellbeing-success.html>
- Please make contact, and get help
- You are not required to tell anyone else about this
- If you are willing to inform the unit coordinator, they may be able to work with other support to reduce the impact on this unit
 - e.g. provide advice on which tasks are most significant

Do you have a disability?

You may not think of yourself as having a 'disability' but the definition under the **Disability Discrimination Act (1992)** is broad and includes temporary or chronic medical conditions, physical or sensory disabilities, psychological conditions and learning disabilities.

The types of disabilities we see include:

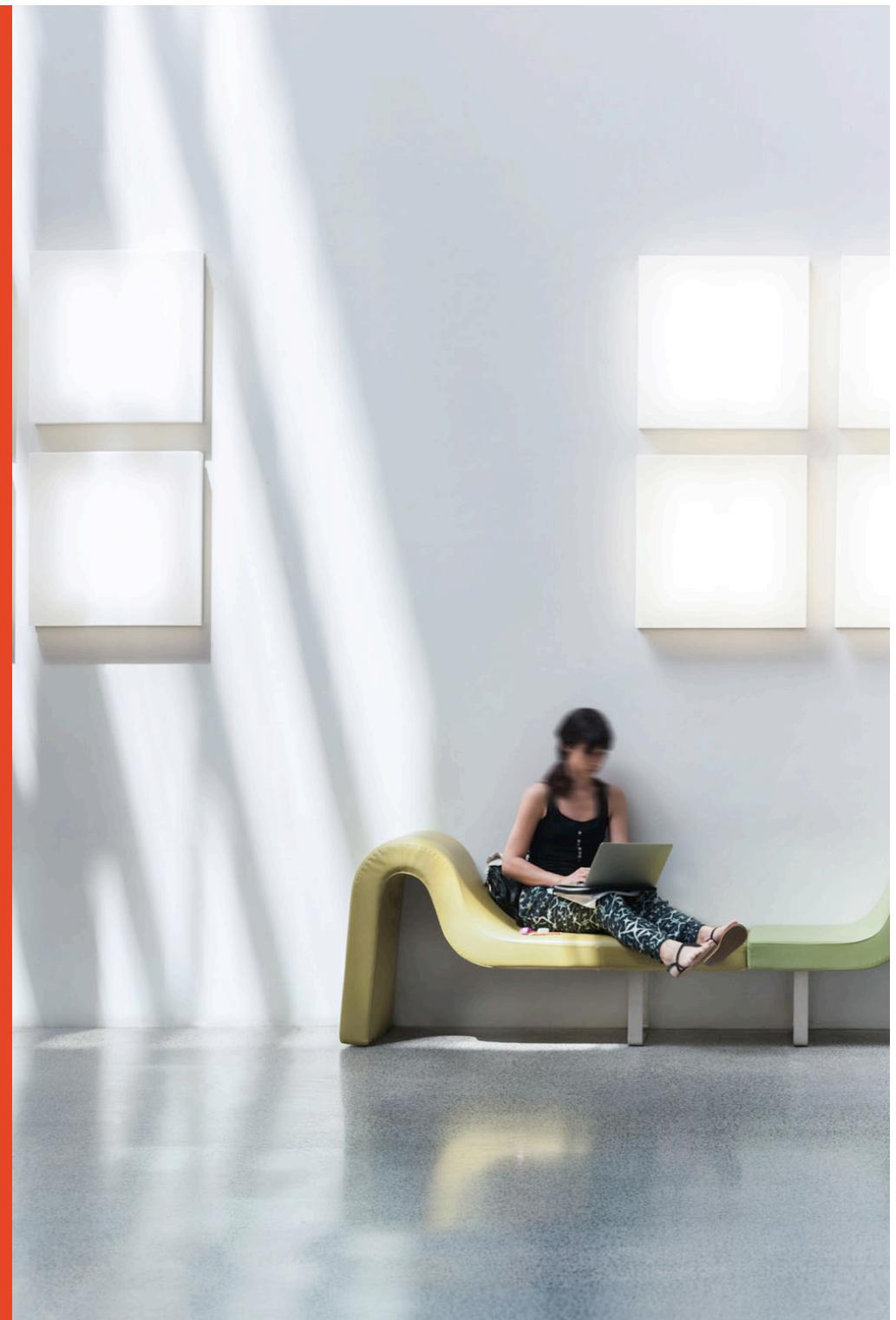
Anxiety // Arthritis // Asthma // Autism // ADHD
Bipolar disorder // Broken bones // Cancer
Cerebral palsy // Chronic fatigue syndrome
Crohn's disease // Cystic fibrosis // Depression
Diabetes // Dyslexia // Epilepsy // Hearing impairment //
Learning disability // Mobility impairment // Multiple
sclerosis // Post-traumatic stress // Schizophrenia //
Vision impairment
and much more.

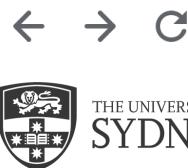
Students needing assistance must register with Disability Services. It is advisable to do this as early as possible. Please contact us or review our website to find out more.



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Disability Services Office
sydney.edu.au/disability
02-8627-8422





Get help in an emergency: We are committed to providing a safe environment for all students.

[More information](#)

Current students

[Home](#) / [Student life, wellbeing and support](#)

Student life, wellbeing and support

Everything you need to know about the student services, resources and events available to support you while you study.



Health and wellbeing

Academic support

Personal support

Get connected



Careers

Right from your first year at university, you have access to an abundance of career counselling services and resources to help put you in the best career position by the end of your degree.



Transition to Sydney

Whether an international student travelling to Sydney from overseas, or a domestic student transitioning to uni life, we have info and support services to help you settle in.



Support with your study decisions

Our Advising hub provides one-on-one support to help you make study-related decisions that will help you achieve your personal and academic goals.

[Book an appointment now.](#)

All University of Sydney Students have free access to:

Innowell



The right resources and support at the right time to maintain and improve your physical and mental health.

TalkCampus



Free and instant support for your mental health and wellbeing anytime of the day, anywhere in the world.

All University of Sydney **International Students** have free access to:

Sonder



24/7 safety and wellbeing app to get you the support you need whenever and wherever you are.

Safer Communities Office



- Support and case management for people who have experienced sexual misconduct, domestic/family violence, bullying/harassment or issues relating to modern slavery.
- Contact the team
 - 8:30 am to 5:30 pm Monday to Friday, Sydney local time
 - phone: +61 2 8627 6808
 - email: safer-communities.officer@sydney.edu.au.
 - campus: Level 5, Jane Foss Russell building, City Road, Darlington Campus
- Make a report
 - [Visit the website](#) to make a complaint or disclosure of sexual misconduct to the University.

Other support

- Learning support
 - <http://sydney.edu.au/study/academic-support/learning-support.html>
- International students
 - <http://sydney.edu.au/study/academic-support/support-for-international-students.html>
- Aboriginal and Torres Strait Islanders
 - <http://sydney.edu.au/study/academic-support/aboriginal-and-torres-strait-islander-support.html>
- Student organization (can represent you in academic appeals etc)
 - <http://srcusyd.net.au/> or <http://www.supra.net.au/>
- Please make contact, and get help
- You are not required to tell anyone else about this
- If you are willing to inform the unit coordinator, they may be able to work with other support to reduce the impact on this unit
 - eg provide advice on which tasks are most significant

Advice

- Metacognition
 - Pay attention to the learning outcomes in Canvas
 - Self-check that you are achieving each one
 - Think how each assessment task relates to these
- Time management
 - Watch the due dates
 - Start work early, submit early
- Networking and community-formation
 - Make friends and discuss ideas with them
 - Know the other research students working in CS and beyond
 - Keep supervisors and lecturer informed, especially if you fall behind
- Enjoy the learning!

CS All Student & Staff 2023 - Meet & Greet

Join and meet your School of Computer Science lecturers, staff, and peers

Everyone is welcome!

Tuesday 28th February
J12 - Wintergarden 3:30 - 5:30 PM



Agenda

- Administravia
 - Expectations
 - Assessment
 - Policies
 - Workplace Health and Safety
 - General Advice and where to get Assistance
- Research
 - Definition, key components, process
 - Finding/refining Research topics
 - You and your supervisor
 - Literature

General Definition of Research

1) From the Merriam-Webster dictionary:

- 1: careful or diligent search
- 2: studious inquiry or examination; especially: investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or laws in the light of new facts, or practical application of such new or revised theories or laws
- 3: the collecting of information about a particular subject

2) Booth, Columb & Williams, “The Craft of Research”:

- “Research is gathering information that answers a question and so solves a problem.”

Academic Research

- In academic research, you must not only answer a question, but you must find something new and interesting
- You join a community of researchers
 - You must advance the collective understanding of this community
- Each community has a cumulative tradition with a set of interesting questions, tools and methods, practices, a style and language for writing up the research
 - Research is a conversation and ongoing social activity!
- You need critical and careful reading of published research
 - to learn what the community already knows
 - to fit your work into the community
 - to be prepared for your own work to be critically evaluated

The Research Process



- Key components
 - A **question of interest** (research question)
 - A **claim** (contribution)
 - **Evidence**
 - **Argument** (linking evidence to claim)
- Systematic application of one or several research methods

A Research Question

- Every piece of research should address a question of interest to the community
 - Providing high-quality answers to non-trivial questions
- Each community has traditional questions:
 - What happens? Why does it happen? How should one do something? What something should one do?
- Many questions fit into an on-going agenda, e.g.
 - Distributed Systems foundation – designing better systems, clouds, data centres, dedicated systems etc.
 - Data mining foundations – mining sequential data; high-performance implementations of data mining algorithms, etc.
 - Mining emerging data - e-commerce , web search data, moving object data, data from sensor networks, multi-source user data
 - ...
 - Consult recent Journal or Conference Calls for Papers

A Claim (Contribution)

- Every piece of research makes a claim (the “contribution”) answering a question of significance
- Claims can be very diverse among fields and within fields
 - This is what happens – e.g. how often is the data corrupted when using weak concurrency control
 - This is why something happens - what key factors lead to project success in open-source development
 - This is a better way to do something - modifying algorithm X in a particular way improves its performance (speed, accuracy, etc)
 - This is a better something to do - our system interface can explain very complex hidden data to a human

Be explicit about
the meaning of “better”

Evidence

- You must back up the claim
- Evidence can be very varied, for example:
 - a **prototype** implementation to show that a system can be built to achieve claimed functionality and experimentation using the prototype
 - A **controlled experiment** to test the causal relationship between one or more independent variables and a dependent variable
 - A **simulation model** which is executed to show a system has certain properties
 - **Measurements** of a running system to show it has good performance
 - **Observations or data gathering** of variables of interest in an organization to test conjectures
 - A **mathematical proof** to show that some process has desired properties
 - **Empirical data** of a machine learning algorithm to evaluate its accuracy
- Various research methods, each defined by the sort of evidence that it can produce
 - each community has its own standards of quality and reasonableness

There are as many scientific methods as there are individual scientists.

Percy W. Bridgman.....On “Scientific Method”

Argument

- You should show that the evidence you offer supports the claim you make
 - It is essential that you deal with natural or obvious objections to the correctness or importance of the work
 - that is, you must think like your readers, and anticipate their reactions
- In systems work, this is often called an “evaluation” of the design

Claim and Argument – Examples (1)



- This system design leads to better performance on some metric
 - make sure you limit how much worse this makes other metrics (such as cost!)
 - make sure your measurements are fair (don't compare with "strawman" design but with state-of-the-art)
- This system design offers better functionality for some uses
 - make sure you show it can be implemented with adequate performance



Claim and Argument – Examples (2)

- This behaviour can be explained by this theory
 - make sure you don't have confounding factors such as level of experience, or method novelty, or subject expectations (“placebo effect”)
- This is what happens
 - make sure you don't interfere too much with what happens when you gather data, or misinterpret it due to observer expectations

Common Mistakes



- **Gather lots of data without a focused question or method**
- **A collection of facts is not a contribution!**
 - it must reveal some pattern or understanding that you make explicit
- **Build a system without a focused question or planned evaluation**
 - E.g. let's see how to use aspect-oriented programming in a sensor network
- **An innovative system by itself is not a contribution!**
 - it must be a worthwhile innovation in a sense you make explicit what the innovation delivers
 - E.g. better performance, better functionality

Negative Results

- Sometimes, you don't get the result you hoped for
 - You gather data that does not reveal any pattern or understanding
 - E.g. no factor seems to correlate well with project success
 - You design a system that turns out to be worse than the state-of-the-art
 - E.g. your machine learning algorithm runs slower than expected
- You can still salvage a thesis
 - Try to find some way to contribute to our understanding, or suggest fruitful directions for further work
 - E.g. what features of the algorithm make it slow
 - Make sure the problem is intrinsic, not just bad coding/experiment design/etc.

Ground-Breaking Work

- Very rarely, a piece of research will establish a whole new agenda for a field, or even a new field
 - the contribution can be as much in the possibilities for further work, as in the result itself!
- In some sense, this is work that asks a new type of question, or introduces a new method
- We don't recommend this for Hons/MIT/MSc/..PhD
 - save the idea till you have enough time and flexibility to deal with inevitable digressions/difficulties

Relationship with your supervisor

- The “Great Expedition into Unknown Terrain” metaphor

Dr Imke Tammen

students and supervisors as co-explorers

Idealised Research Process

- **Question**
 - Find a question to seek an answer for
- **Method**
 - Choose an appropriate research method and make flexible plans
- **Evidence**
 - Gather the data, do the experiment, build the prototype etc.
- **Contribution**
 - Analyse, interpret, and conclude
- **Argument**
 - Write the report
 - Importance of “writing” to convey your ideas and contribution

Actual Research Process

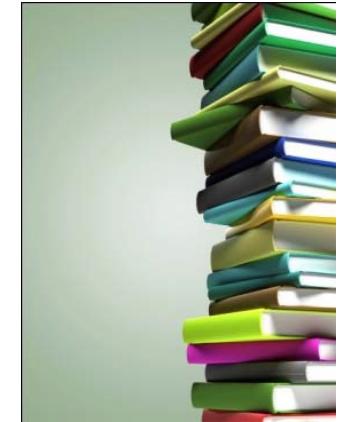
- Research is a non-linear process !
 - It is normal for the process of gathering evidence leads to changes to the claim
 - sometimes one refines the claim
 - E.g. limit the scope (from “X has higher performance” to “X has higher performance if parameter Y is low”)
 - sometimes one must change the claim entirely
 - sometimes while gathering evidence, one finds new questions which look worth answering!
- New claims or questions need further evidence, revised plans, maybe even different methods

If I have seen further, it is by standing on the shoulders of giants.

Sir Isaac Newton

The Literature

- Literature can help in finding a research problem
 - identify clear “next step” or “gap”
- It can also help you solve a problem
 - show how the field works (so you fit in)
 - provide evidence you can quote without repeating the work
 - provide the motivation to show importance
 - eg our performance is better than that of [Cite]
 - eg [Cite] defined the following concept, about which we prove ...
 - eg [Cite1, cite2, cite3] have all worked on systems like this.
- Critical (yet generous) reading.



Reading the literature

- Keep an annotated bibliography from the start
 - Complete bibliographical reference (including pages, dates)
 - USE a bibliographic system (EndNote, Mendeley, BibTeX, etc..)
- Detailed notes on each work
 - even if it seems irrelevant to your thesis
 - what is claimed, what evidence, what argument, any doubts?
- Don't rely on second hand summaries! Always go to the original source!
 - Get attributions right in your own writing (don't just accept citations from other work, even with full reference!)
- Use comments and keywords to organise your thoughts.

Why Review the Literature ?

- Demonstrate that you know the field
- Justifies and provides the rationale for your research
 - how does your work *differ* from previous work
 - how does your work *connect to* previous work
- Allows you to establish the conceptual framework and methodological focus
- Gives you the knowledge of your research community's scientific practices, to get your research understood and endorsed
- Assignment 2 → *thesis chapter*

Organising the Literature

- Isolate issues and highlight the findings and contribution that are central to your research
- Group together papers that deal with a common or related theme or issue
- Use diagrams, tables, concept maps to organise the materials
- Try out different structures for organising; they should be most relevant to the goals of your research
- Chronological order is not particularly useful
 - but citation chains are useful
- Cf Learning Centre's workshop
- Exemplars provided on Canvas

Guide to Research Literature

- Types of publications
 - Conference and Workshop papers
 - Journal papers
 - Technical reports
 - Monographs
 -

Conference Papers

- Call for papers - ~1 year before meeting
- Paper submission - ~4-8 months before meeting
 - Page limit e.g. 8 pages
 - Details often omitted (proofs, design technicalities)
- Program Committee reviews the papers
 - Criteria: significance, originality, soundness, readability
- Final version for proceedings due ~3 months before meeting
 - revised by author in light of reviews
 - but usually not checked again
- Annual or bi-annual conferences

Selection Process

- Typically 3 reviewers
- Acceptance rate – varies (Some 10-15%, others 50%)
- Single blind or double blind reviewing model

Example of questions on a review form:

- How **novel** is the described research? Are the authors aware of **related work**?
- What is the **scientific contribution** of this submission? Is it clearly explained, in terms of how the paper **advances the field** or contributes to related fields?
- Is the work **technically sound**? Are there enough methodological details? Are **claims convincingly substantiated**, either through theoretical argument or empirical data?
- How **significant** is the research? Will the paper be likely to have an **impact** on the community?
- Do the authors describe the **limitations** of their approach in a satisfactory manner?

Standard of conferences

- Identify the most reliable and important conferences in your area
 - Ask your supervisor for guidance
- CORE ranking (sometimes inaccurate):
<http://portal.core.edu.au/conf-ranks/>
- Affiliation (ACM, IEEE, etc..)
- Acceptance rate and review process
- Check with your supervisor!

Workshop Papers

- A workshop is typically a smaller meeting than a conference, usually on an emergent topic
- Sometimes workshop papers are just like conference papers
- Other workshops are more preliminary
 - can publish a position paper (draft of an idea without evidence, or proposal for future work)
 - Can be less rigorously reviewed, the goal is mainly to allow the community to meet

Journal Articles

- Typically longer than a conference paper
- Often based on a conference paper with additions, corrections and improvements
- Refereed by
 - at least 3 reviewers, experts in the field
 - they spend months on the paper checking details, etc.
- Decisions: accepted, accepted with minor revisions, major revisions and resubmission, rejected
 - Revisions, refereed again
 - Accepted, published after several months (journal issues have limited capacity)
- Time from submission to publication varies, 6 months-1.5 years

Standard of Journals

- Many journals in each area with different standards
- Typically IEEE Transactions and ACM Communications are some of the top-ranked journals
 - Not all IEEE Trans. and ACM Comm. are top journals
- Check CORE ranking (not always accurate though- check with your supervisor)

<http://portal.core.edu.au/jnl-ranks/>

- Scopus
- Journal quality indicators, such as S^{CI}mago Journal Rank (SJR) and Journal Citation Reports (JCR)
- journal's impact factor (see later today)

Ask your supervisor which journals are the top-ranked and most important in your area!

PhD or MSc Thesis

- **Very extensive account**
 - Show much of the research process
 - Extensive survey of the literature
 - Very complete evaluation of the work
- The goal is to establish that the author is ready to become independent researcher
 - i.e. PhD and MSc provide research training
- Typically evaluated by 2-3 examiners, and may contain chapters that are published

Monograph

- A collection of selected papers from a conference or workshop
 - A bit more checking than for the conference/workshop
- An author can offer a coherent and unified account of a whole research topic
 - often combines their own results with other people's
 - Revisits several papers using unified notation, better exposition, better literature review, etc.
 - Publisher may get reviewers but their focus is “will it sell” not “is it correct”

Forward and Backward Citation Search

- Papers referenced by this paper (backward search)
 - Other papers written by authors of the paper
 - Keyword searches using keywords from this paper
 - Papers that have cited this paper (forward search)
-
- Iterative use of above on new good papers found.

Using Search Engines (e.g. Google)

- Googling keywords can be useful - but can also generate a lot of useless material. You MUST critically evaluate what you find this way!
 - is it published in a peer reviewed forum.
 - is the publication venue high quality.
 - are the authors generally respected.
- Wikipedia entries may have useful pointers to key works.
- Use **Google Scholar**:
 - to check citations (of specific paper or author generally)
 - advanced search to limit by publication source
 - limit by year of publication

Warnings

- Quality of conferences and journals varies, and this is reflected in the checking of the papers
 - Read papers with a critical eye!
- Some communities are very clique-dominated
 - Unpopular opinions are not welcome
 - Clique leaders can publish anything, even half-baked ideas without evidence

Fake Conferences and Random Papers

- <http://pdos.csail.mit.edu/scigen/>
- Randomly generated (and non-sensical) papers accepted to conferences and journals ?!

Quality Metrics

- How important is an article? How influential is an author?
- Based on citation analysis - number of times a paper or author is cited
 - How to calculate citations – Google Scholar + other software
 - Check the [Library's services](#)
- Assumption: important authors and articles are cited more often than the others
 - Increasingly used by governments, funding bodies, promotion committees to evaluate the quality of author's work
- Some drawbacks
 - Citing errors – authors with the same names are not separated
 - Cliques (friends, colleagues) cite each other in turn to build their citation index
 - Negative citations are included (citations to incorrect results)

Google Scholar

- <https://scholar.google.com>
- Find Articles
- Find Authors
- Find top publication venues (in terms of impact) in a given field
- Discipline agnostic (very useful for multi-disciplinary domains)
- Includes open access venues, university publishers etc.
- H-index and number of citations

Other useful tools

- Scimago**

<https://www.scimagojr.com/>

Journals, some conferences, countries ranking

- Scopus**

<https://www.scopus.com>

- Research Gate**

<https://www.researchgate.net>

Journal's Impact Factor

- Journal impact factors
 - Used to determine the importance of a journal
 - E.g. journal impact factor for 2021 =
$$\frac{\text{\# citations in 2021 to articles published in the journal in 2019-20}}{\text{\# articles published in the journal in 2019-20}}$$

(similarly 5 year IF etc.)

More information and tools on the [Library website](#)

CORE's ratings

- Computing Research and Education Association of Australasia (CORE)
 - Australia and New Zealand
- Ranking of conferences in CS
 - <http://portal.core.edu.au/conf-ranks/>
- Outdated ranking for journals
 - <http://portal.core.edu.au/jnl-ranks/>

Author's Citation Indexes for Measuring Impact (2)

- total number of citations
- h-index

proposed by J.E. Hirsh in 2005:

“A scientist has index h if h of his/her N_p papers have at least h citations each, and the other (N_p-h) papers have no more than h citations each. ”

- What is the h-index below?

Paper 1: 20 citations

Paper 2: 15 citations

Paper 3: 8 citations

Paper 4: 4 citations

Paper 5: 3 citations

...

An h-index of 4 means that there are at least 4 papers cited at least 4 times each.

- Where can you see citations: Google Scholar, Research Gate, Scopus etc.

Author's Citation Indexes for Measuring Impact (2)

- **g-index**
 - Proposed by L. Egghe 2006:

“Given a set of articles ranked in decreasing order of the number of citations that they received, the g-index is the (unique) largest number such that the top g articles received (together) at least g^2 citations.”
 - improves h-index by giving more weight to highly cited articles
- Several variants of h-index and g-index

Calculate the g-index for the example from the previous slide!

h vs g index

h-index?
g index?

A

Rank	# cit.	R ²	\sum cit
1	5	1	5
2	5	4	10
3	5	9	15
4	5	16	20
5	5	25	25
6	5	36	30
7	5	49	35
8	5	64	40
9	5	81	45
10	5	100	50

B

Rank	# cit.	R ²	\sum cit
1	100	1	100
2	50	4	150
3	50	9	200
4	50	16	250
5	5	25	255
6	5	36	260
7	5	49	265
8	5	64	270
9	5	81	275
10	5	100	280

h vs g index

Rank	# cit.	R ²	\sum cit
11	5	121	285
12	5	144	295
13	5	169	300
14	5	196	305
15	5	225	310
16	5	256	315
17	5	289	320
18	5	324	325
19	5	361	330
20	5	400	335

Publish or Perish

- For more resources on citation and impact analysis:
<http://www.harzing.com/resources.htm#/pop.htm>
- Perform a citation analysis of your supervisor's publications!
- Beware: What are the limitations of citation analysis in general?
- Read “the Rise and Rise of Citation Analysis” by L. Meho!

- Next week
 - Library session
 - How to build an annotated bibliography (Learning Centre)

Important:

- Fill out this form by next week so that I have your supervisor's details