How to Write Good Scientific Papers: A Comprehensive Guide

PROMETEO
Investigación
Formación
Desarrollo

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Outline

- Introduction
- Starting Point: A Good Research Idea
- Types of Scientific Papers
- Structure of a Scientific Paper
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- Writing Style
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Outline

- Submission
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- Paper Dissemination
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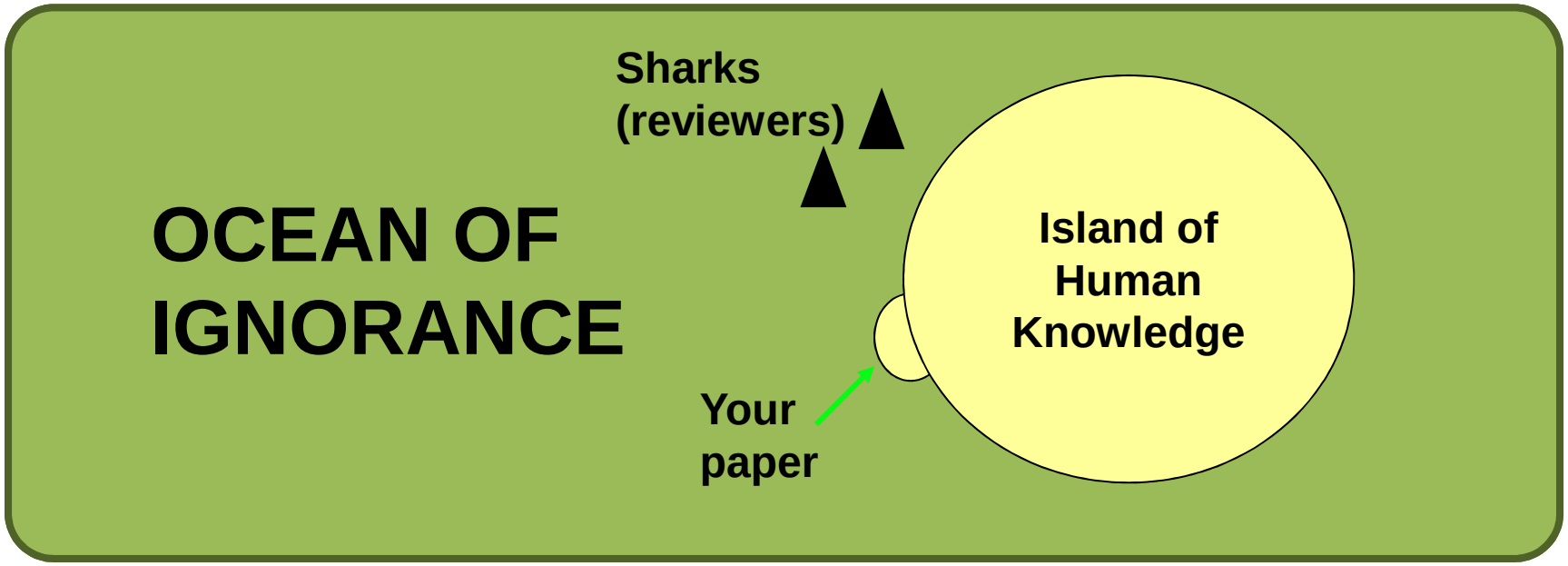
Introduction

- Motivation and Scope
- Objectives and Approaches
- Main Contributions
- Overview: What makes a good scientific paper?

Introduction

- **Motivation and Scope**
  - What is a **scientific paper**?



From [Jacob, 2009]

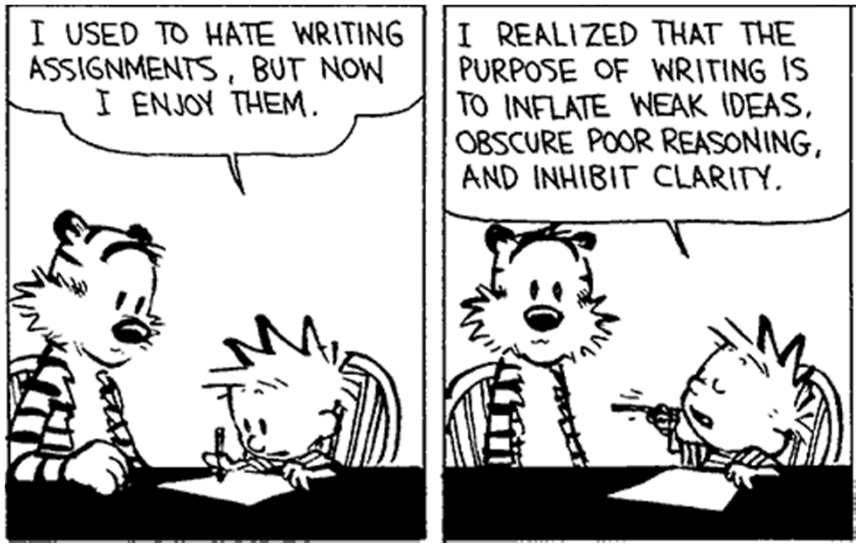
Introduction

- **Motivation and Scope**
  - What is a **scientific paper**?
    - Intentionally too general definition
      - A published manuscript with original contributions to extending human knowledge in some field
    - Detailed definition
      - I hope you get it after reading these guidelines ☺
    - Other definitions
      - Check, for example, [Day, 1998] or http://journalology.blogspot.com/2010/08/what-is-scientific-paper-1-observations.html

Introduction

- **Motivation and Scope**
  - Why publish?

Papers “are important because without them scientists cannot get money from the government or from universities” [Schulman, 1996]



Introduction

- **Motivation and Scope**
  - Why publish?
    - **Scientific career**: should be centered in the **creation of knowledge**
      - More than on the transmission of knowledge
    - Publish so that **others can benefit from your contribution** to understanding the world
      - And because it is key for your scientific career

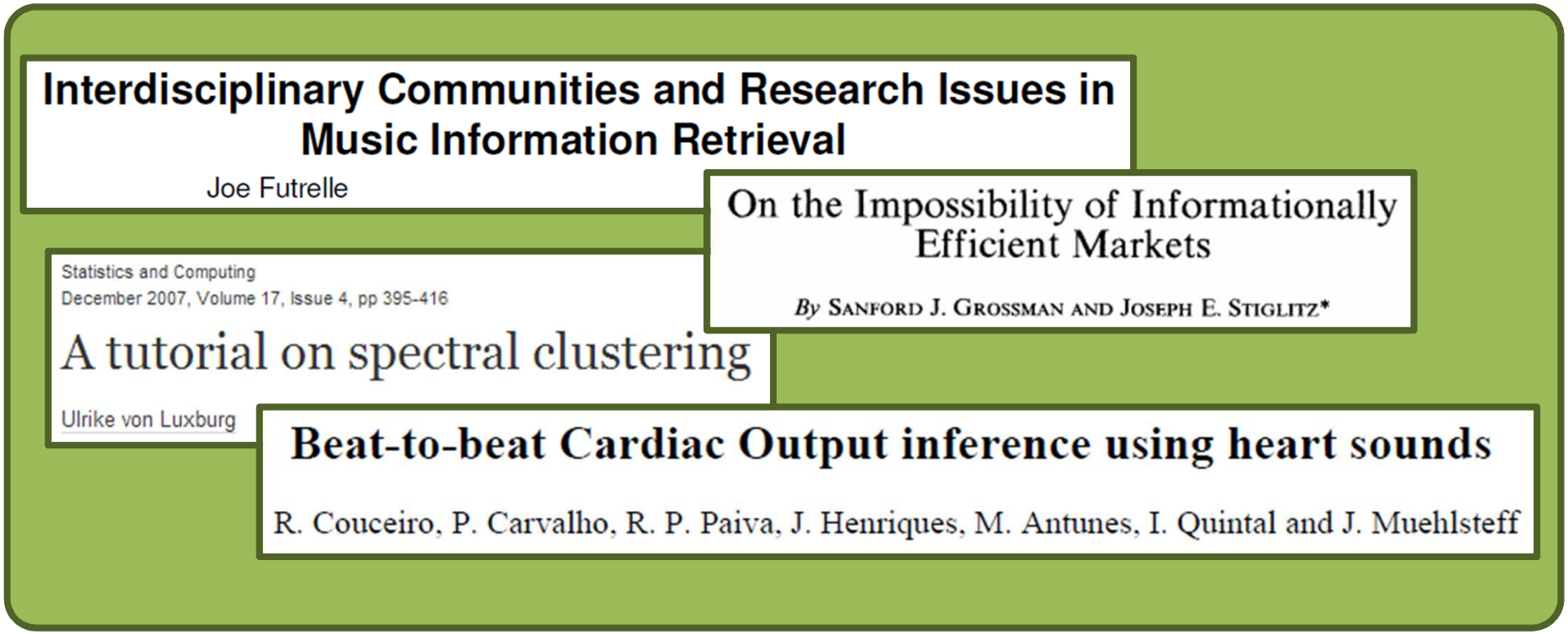
Quality should be preferred over quantity

Avoid "**salami" publication** [Lawrence, 2012a]

- Slicing one good, comprehensive paper into several smaller papers

Introduction

- **Motivation and Scope**
  - What to publish?



Introduction

- **Motivation and Scope**
  - What to publish?
    - A **new idea**, e.g., a first solution to an impacting problem
    - A **better solution** to a known problem
      - E.g., a better-performing algorithm (accuracy, speed, etc.)
    - **Knowledge gaps**
    - **Multidisciplinary ideas**
    - **General** or **specific** problems

Introduction

- **Motivation and Scope**
  - What to publish?
    - **Results of experiments**
    - **Integration of knowledge**, trends in recent, cutting-edge areas
    - A **proof of the impossibility** of solving a problem
    - …

Introduction

- **Objectives and Approaches**
  - The purpose of this document is to summarize a number of **general guidelines** for **producing good research papers**
    - These guidelines do **not substitute the priceless value of experience**
    - As always, these are **general rules of thumb**
      - Particular cases might require particular approaches
  - I resort to both a **literature review** on the theme and my **personal experience**
    - Other people might disagree with some of my perspectives
  - **Illustrative examples** are used extensively

Introduction

- **Main Contributions**
  - A clear, comprehensive and **integrated overview of the main issues** pertaining to the production of good scientific papers
    - Information about the topic is scattered across several sources
  - **Lessons learned** from my personal experience writing and reviewing scientific papers
    - Enriched with several rejected papers ☺

Introduction

- **Overview: What makes a good scientific paper?**
  - An **original, impacting idea**
    - Demonstrating **scientific, economic, and social impact of the studied problem**
  - The **way you communicate** it
    - Effectiveness of communication, clarity of presentation and thought-provoking discussion are key
  - A good **critical** coverage of **related literature**
  - A **sound methodology**
  - **Good data analysis**
    - Statistically supported
  - The **way you disseminate** it
    - Making it available online (if possible)
    - Doing presentations, communications at meetings and with visitors

Introduction

- **Overview: What makes a good scientific paper?**
  - **Key questions** (adapted from [Cardoso, 2012]
    - Is the research new?
    - Is the research significant to the field of research?
    - Does it clearly motivate and clearly formulate the research question?
    - Does it outline the current knowledge of the problem domain, as well as the state of existing solutions?
    - Does it present clearly any preliminary ideas, the proposed approach and the results achieved so far?
    - Does it sketch the research methodology that is applied?

Introduction

- **Overview: What makes a good scientific paper?**
  - **Key questions** (adapted from [Cardoso, 2012]
    - Does it point out the contributions of the applicant to the problem solution?
    - Does it state in what aspects the suggested solution is different, new or better as compared to existing approaches to the problem?
    - Does it state how the attained results are evaluated or compared to existing approaches to the problem?
    - Does it state how and by whom the expected results can be applied?

Introduction

For beginners: find a **role model**

- Follow the **model of a good paper** of the kind you are writing, in your research field

Start writing the day you start your research

- Even simple, short, unstructured notes will help you
  - Help you staying focused
  - Accelerate the production of the final manuscript
- Write down ideas that come to your mind

Keep a **good and updated bibliographic database**

- Search and read a bit every day

Introduction

Think about **possible journals/conferences early**

Become a **reviewer**

- It will help you to both read and write better
- How?
  - Approach the program committee of conferences and editorial staff of journals
  - Publish! It's likely they will invite you later to become a reviewer

Have a **high number of citations** as your goal

- **Citations** are a standard quantitative way to measure paper quality (excluding self-citations)

Introduction

LISTED BY CITATIONS PER PAPER

Rank	Country	Papers	Citations	Cites per paper
1	SWITZERLAND	172,904	2,873,881	16.62
2	USA	2,967,957	46,796,090	15.77
3	DENMARK	93,538	1,470,961	15.73
4	NETHERLANDS	239,892	3,687,829	15.37
5	SCOTLAND	106,160	1,622,708	15.29
6	ENGLAND	679,394	9,979,737	14.69
7	SWEDEN	174,052	2,548,046	14.64
8	FINLAND	86,472	1,174,321	13.58
9	BELGIUM	130,614	1,756,586	13.45
10	GERMANY	762,599	9,960,100	13.06
11	CANADA	430,856	5,619,293	13.04
12	AUSTRIA	90,971	1,158,252	12.73
13	ISRAEL	108,706	1,363,975	12.55
14	NORWAY	67,189	839,931	12.5
15	FRANCE	542,293	6,660,630	12.28
16	WALES	35,707	434,969	12.18
17	AUSTRALIA	284,250	3,359,748	11.82
18	ITALY	409,232	4,770,753	11.66
19	NORTH IRELAND	17,464	201,859	11.56
20	IRELAND	41,624	469,554	11.28

SOURCE: *ESSENTIAL SCIENCE INDICATORS*[SM] FROM THOMSON REUTERS, TIME PERIOD: 2000-AUGUST 31, 2010 (FOURTH BIMONTHLY PERIOD OF 2010).

From http://archive.sciencewatch.com/dr/cou/2010/10decALL/

Introduction

Further reading

- Day R. (1998). “How to write and publish a scientific paper”, 5th Edition, Cambridge University Press
- Peat J., Elliott E., Baur L. and Keena V. (2002). “Scientific Writing, Easy When You Know How”, BMJ Books

Starting Point:
A Good Research Idea

Starting Point: A Good Research Idea

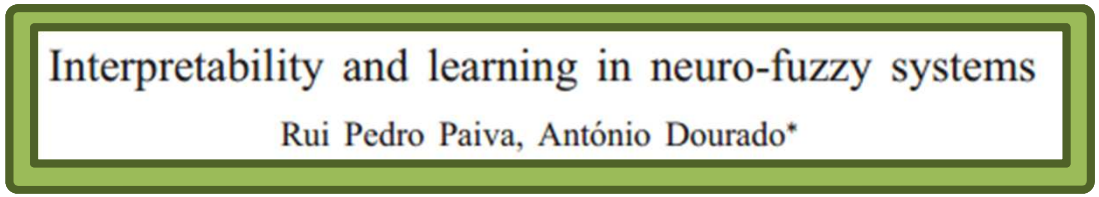
- **Good research idea: key for a good paper**
  - Although not sufficient
    - Good writing is as important
- **Typically, within a Scientific Project**
  - Often, you write papers as part of the research within a scientific project
  - **Good ideas: what and how?**
    - See [Paiva, 2013]: "How to Write Good Scientific Project Proposals: A Comprehensive Guide"

Types of Scientific Papers

- Research Papers
- Review Papers
- Tutorial Papers
- Papers on Developed Systems or Applications
- Case Description Papers
- Others

Types of Scientific Papers

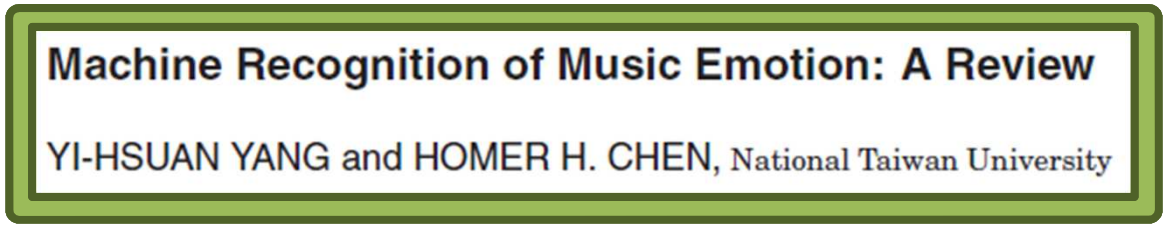
- **Research papers**
  - The “typical” paper
  - Propose **new concepts, problems, approaches to known problems, algorithms, devices, experiments**, etc.
  - Compare your results with the state of the art


Interpretability and learning in neuro-fuzzy systems

Rui Pedro Paiva, António Dourado*

Types of Scientific Papers

- **Review Papers**
  - Organized and **structured descriptions of a cutting-edge research theme**
    - Information scattered across different sources, hard to find elsewhere
  - Summarize, analyze, evaluate or synthesize already published information
  - Sources of new ideas
  - Typically long



Types of Scientific Papers

- **Tutorial Papers**
  - Detailed **description of a relevant and useful topic**, unfamiliar to a significant number of researchers

Types of Scientific Papers

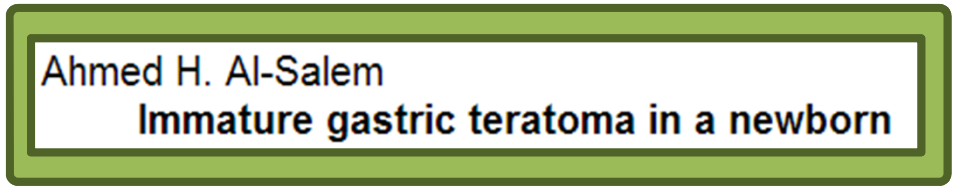
- **Papers on Developed Systems or Applications**
  - Describe
    - **Problem** to solve
    - **Development difficulties**
    - **Implementation** choices
  - Compare your system with others
    - Performance, usability, features, etc.


MOODetector: A Prototype Software Tool for Mood-based Playlist Generation

Luís Cardoso[1,2] , Renato Panda[1,2] and Rui Pedro Paiva[1,3]

Types of Scientific Papers

- **Case Description Papers**
  - Common in areas such as medicine
    - Authors describe a **number of clinical cases** and the followed approaches



Types of Scientific Papers

- **And others…**
  - Hypotheses
    - Preliminary “pilot studies” that may establish the basis for further in-depth investigations
  - Editorials
    - Presentation of points-of-view or opinions relating to the editorial purpose of a journal
      - Typically by the editor
  - Letters to the Editor
    - Communications directed specifically to the editor, critically assessing some aspect of the journal
      - E.g., point-up a deficiency in a recently published paper
  - Conference Reports
    - Description and analysis of conferences, particularly abstracts of presentations, prior to their publication in a proceedings volume or elsewhere
  - …

Types of Scientific Papers

Further reading

- Lawrence D. J. (2012b). “Types of Scientific Articles”, Presentation, Course on Scientific Writing, URL: http://w3.palmer.edu/lawrence/Scient_Writ/PPT/Session%202%20CRT.ppt

Structure of a Scientific Paper

- **Extended IMRAD**

Structure of a Scientific Paper

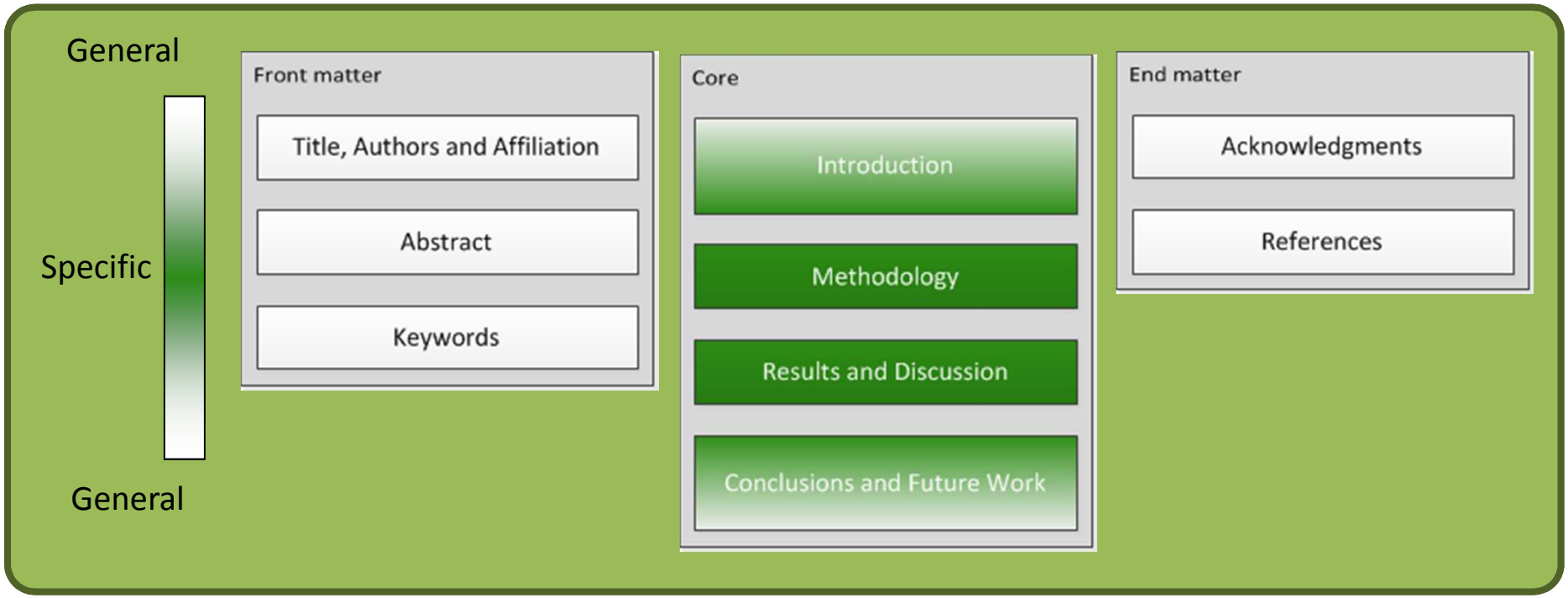
- **Goals**
  - Adequately organize your paper, promoting clarity and objectivity
- **How?**
  - Typical structure: IMRAD format
    - **I**ntroduction
    - **M**ethodology
    - **R**esults
    - **A**nd
    - **D**iscussion

Structure of a Scientific Paper

- **How?**
  - Other info:
    - **Front matter**
      - Title, Authors and Affiliation
      - Abstract
      - Keywords
    - **Conclusions and Future Work**
    - **End matter**
      - Acknowledgments
      - References

Structure of a Scientific Paper

- **Extended IMRAD**



Inspired from [Zucolotto V., 2011] (Adapted from [Hill et al., 1982])

Structure of a Scientific Paper

Key findings should be placed in **key sections**

- **Abstract, introduction and conclusions**
- Diagonal readers must get the message by following their typical reading style

These are guidelines

- The **structure may differ** from paper to paper and across communities.
- Journals/conferences might **impose a template**, but it **generally follows** the **extended IMRAD structure**

Structure – Title

- **Goals**
  - Create an appealing **main door** to the paper
    - Decision to read your paper or not depends a lot on the title
- **How?**
  - Should brief and rigorously summarize the **essence of the paper**
    - Attractive, objective, precise, fully descriptive, concise and clear title
  - Should be **specific** (not too general)

Modulation Filtering for Noise Detection in Heart Sound Signals

Structure – Title

Make a list of the **keywords** that reflect the described work

Use the **minimum number of words** that adequately summarize the content of the paper

- Avoid titles with more than 10 words

Sometimes the title may contain the **conclusion of the paper**

Rewrite the title in the final version of the paper

Structure – Title

Sometimes, it is better if the title contains **2 parts** (as in this case)

Don’t use acronyms and abbreviations in the title

Avoid waste words (studies on, investigations on, a, an, the, etc)

Review the title again and again

Structure – Authors

- **Goals**
  - Identify the **authors of the paper**
    - Executors of the described work
    - Writers
    - Project colleagues
    - …

Structure – Authors

- **How?**
  - Follow guidelines that define authorship
  - Ethics is important
    - **All authors must be able to present/discuss/defend the paper**
      - **Honorary authorship** happens frequently… Valid or not?
        - » Often used to facilitate acceptance or citation
        - » Sometimes **projects have honorary team members** (for the same reasons) → those members tend to become honorary co-authors

R P Paiva[1], P Carvalho[1], R Couceiro[1], J Henriques[1], M Antunes[2], I Quintal[3], J Muehlsteff[4]

Structure – Authors

- **How?**
  - Author ordering
    - **First author**
      - Main executor of the described work
      - Main writer (even if not the main responsible for the described work)
    - **Other authors**
      - In the order of contribution to the described work
    - **Last author**
      - Typically, a **senior researcher**, e.g., a **supervisor** (even though he proposes the idea of the work, project, etc.)

Structure – Affiliations

- **Goals**
  - Identify the **institutions** to which the authors belong
- **How?**
  - Name, physical address, e-mail
    - One for each individual institution

R P Paiva[1], P Carvalho[1], R Couceiro[1], J Henriques[1], M Antunes[2], I Quintal[3], J Muehlsteff[4]

[1]Center for Informatics and Systems of the University of Coimbra, Pólo II, 3030-290 Coimbra, Portugal
[2]Cardiothoracic Surgery Center, Hospitals of the University of Coimbra, Praceta Mota Pinto, 3049 Coimbra, Portugal
[3]Hospital Center of Coimbra, Quinta dos Vales, 3041-801 Coimbra, Portugal
[4]Philips Research Laboratories Europe, HTC, 5656AE Eindhoven, Netherlands

Structure – Abstract

- **Goals**
  - Like the title, should be **brief** and rigorously summarize the **essence of the paper**, now with a few more words (typically, between 200 and 400 words)
    - Like the title, may be the only thing other people will read: **Is it worth reading the paper?**

Structure – Abstract

- **How?**
  - Describe concise, clear and objectively:
    - **What** the authors have done
      - Blunt, right-to-the-point approach
        - » 1 or 2 sentences
    - If necessary and you have space, say **why** (1 or 2 sentences)
    - **How** they have done it (briefly)
      - 3 or 4 sentences
    - The **main results** (showing quantitative numbers, if it is the case)
      - 3 or 4 sentences
    - The **importance and impact** of the results
      - 1 or 2 sentences
    - **First sentence**: state the **essence of the paper**
      - Blunt, right-to-the-point approach

Structure – Abstract

This experiment will determine what will make enzymes effective and what will make them **ineffective**. *We tested different samples of enzymes in a spectrophotometer and recorded their absorption rates*. Six samples were placed in the spectrophotometer but two contained no enzyme; these acted as blanks for the other samples. *The four remaining samples contained Catecholase ranging from 0.5 ml to 1.75 m. The second half of the experiment contained four test tubes with a constant amount of Catecholase, but the pH levels ranged from four to eight*. It was found that if the enzyme was present in large amounts, then the absorption rate was high, and if the pH level ranged from 6 to eight then the absorption rate was **high**. *Therefore it can be said that enzymes work well in neutral pH levels and in large amounts*.

From http://writing2.richmond.edu/training/project/biology/abslit.html

Structure – Abstract

This experiment will determine what [illegible]ymes effective a[illegible]em **ineffective**. *We tested different s[illegible] a spectrophotometer and recorded their absorption rates*. Six samples were placed in the spectrophotometer but two contained no enzyme; these act[illegible]mples. *The four remaining sa[illegible]ranging from 0.5 ml to 1.75 m. Th[illegible]ent contained four test tubes with a constant amount of catecholase, but the pH levels ranged from four to eight. It was found tha[illegible]pt[illegible] and if t[illegible] level ranged from 6 to eight t[illegible] rate was **high**. Therefore it can be said that [illegible] in neutral pH levels and in large amounts*.

What exactly is an effective enzyme?

The sentence is addressing what was done, but it's not specific.

- Too long and detailed to be in an abstract.
- Just extraneous information not crucial to understanding the experiment as a whole

- Right information, but too general,
- Specify how high in comparison to samples with low absorption rates.

Avoid saying that the results you obtained are correct or definite. Instead just say that the data supported or did not support your hypothesis.

From http://writing2.richmond.edu/training/project/biology/abslit.html

Structure – Abstract

This experi determine what wil nzymes effective and make them **ine** *We tested different sampl mes in a sp tometer and recorded their ab ates. S* s were placed in the spectrophotome ed no enzyme; these acted as blanks for the *The four remaining samples contained Catec ging from 0.5 ml to 1.75 m. The second half of the e ntained four test tubes with a constant amou but the pH levels ranged from four t was at if the enzyme was present in large a then the n rate was high, and if the pH l ed from 6 to the absorption rate was **hig** re it can be said t mes work well in neutral pH and in large amounts.*

From http://writing2.richmond.edu/training/project/biology/abslit.html

Structure – Abstract

This experiment was performed to determine the factors that positively influence enzyme reaction rates in cellular activities since some enzymes seem to be more effective than others. **Catecholase enzyme activity was measured through its absorption rate in a spectrophotometer, using light with a wavelength of 540 nm**. *We compared the absorbance rates in samples with varying enzyme concentrations and a constant pH of 7, and with samples with constant enzyme concentration and varying pH levels*. **The samples with the highest enzyme concentration had the greatest absorption rate of 95 percent compared to the sample with the lowest concentration and an absorption rate of 24 percent. This suggests that a higher concentration of enzymes leads to a greater product production rate.** *The samples with a pH between six and eight had the greatest absorption rate of 70 percent compared to an absorption rate of 15 percent with a pH of 4; this suggests that Catecholase is most effective in a neutral pH ranging from six to eight.*

From http://writing2.richmond.edu/training/project/biology/abslit.html

Structure – Abstract

This expe *termine the factors that positively influence* *ular activities since some enzymes seem to be more effective than others.* **Ca** **activity was measured through its absorption ra** **spectrophotometer, using light with a wavelength of 540 nm.** *We co* *samples with varying enzyme co* *pH 7, and with samples with constant en* *pH le* **highest enzyme concentration had the** **percent compared to the sample with** **an absorption rate of 24 percent. This s** **concentration of enzymes leads to a greater product production rate.** *The samples with a pH between six and eight had the greatest absorption rate of 7* *an absorption rate of 15 percent with a pH of* *atecholase is most effective in a neutral pH ranging from six to eight.*

- Sentence is clear and concise
- Tells the reader why the experiment was carried out

Sentence introduces the specific enzyme being studied and how it was studied (quantitatively).

- Sentence defines what was done without going into too much detail.
- The controls and the variables are stated clearland succinctly

- Clear summary of results, with quantitative numbers
- Conclusions drawn from the results and very clear to the reader
- Evidence of generality

Continuation of good summary and clear conclusions

From http://writing2.richmond.edu/training/project/biology/abslit.html

Structure – Abstract

This experiment was performed to determine the factors t positively influence enzyme reaction rates in cellular activities si me enzymes seem to be more effective than others. **C ase enzyme activity was measured through its absorption spectrophoto ter, using light with a wav 540 nm**. *We compared the bance rates in sam rying enzyme concentrations a nstant pH of samples with constant enzyme concentra varyi* **ne samples with the highest enzyme co test absorption rate of 95 percent compared t e lowest concentration and an absorption rate of suggests that a higher concentration of enzym greater product production rate.** *The samples with a pH be and eight had the greatest absorption rate of 70 perce npared to an absorption rate of 15 percent with a pH of 4; this ggests that Catecholase is most effective in a neutral pH ranging from six to eight.*

From http://writing2.richmond.edu/training/project/biology/abslit.html

Structure – Abstract

Abstract

We investigate the feasibility of using heart sound (HS) to accurately measure the opening and closing moments of the aortic heart valve. These moments are crucial to define the main systolic timings of the heart cycle, i.e., PEP and LVET. Systolic time intervals are highly correlated to fundamental cardiac functions. Several studies have shown that these measurements have significant diagnostic and prognostic value in heart failure condition and are adequate for long-term patient follow-up and disease management.

We introduce an algorithm for automatic extraction of PEP and LVET using HS and ECG. PEP is estimated with a Bayesian approach using to the signal's instantaneous amplitude and patient-specific time intervals between atrio-ventricular valve closure and aortic valve opening. As for LVET, since the aortic valve closure corresponds to the start of the S2 heart sound component, we base LVET estimation on the detection of the S2 onset.

A comparative assessment of the main systolic time intervals is performed using synchronous signal acquisitions of the current gold standard in cardiac time intervals measurement, i.e., echocardiography, and heart sound. The algorithms were evaluated on a healthy population, as well as on a group of subjects with different cardiovascular diseases (CVD). In the healthy group, from a set of 942 heartbeats, the proposed algorithm achieved 7.66 ± 5.92 msec absolute PEP estimation error. For LVET, the absolute estimation error was 11.39 ± 8.98 msec. For the CVD population, 404 beats were used, leading to 11.86 ± 8.30 msec and 17.51 ± 17.21 msec absolute PEP and LVET errors, respectively. The results achieved in this study suggest that HS can be used to accurately estimate LVET and PEP.

Adapted from Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG" (some improvements to the original paper were added).

Structure – Abstract

The abstract is often the **most important part of the paper**

- Most readers **only read that**
  - Readers use the abstract to decide weather or not to read and cite the paper
- May be reproduced in **publications that list abstracts**

The abstract is **not an introduction** to the paper

- It is a **brief summary** of each of the main **IMRAD** sections of the paper (see Structure)
  - Brief description of the whole paper, so that **diagonal readers understand it without reading the other parts** of the manuscript

Structure – Abstract

Focus on **what is new** and on **key information**

- Very brief overview of the central ideas of your methodology, key results (quantitative), findings and conclusions

Avoid the classical "In this paper" starting

Avoid bibliographical references in the abstract

Avoid acronyms. If they must be used, their definition should be **repeated** in the main text

Structure – Abstract

Information in the abstract **must be in the main body**

In general, write the abstract in **one paragraph**

Tense: **past** or **present tense** may be used

Structure – Keywords

- **Goals**
  - Select a number of **words** or terms that **characterize the main domains** to which the paper pertains
    - Often employed in electronic search systems (ESS)
- **How?**
  - Should be as **general and common** as possible
    - So that ESS can find the paper in broad searches

Beat-to-beat systolic time-interval measurement from heart sounds and ECG

Keywords: systolic time intervals, cardiac function, heart sound segmentation

Structure – Keywords

Some of the keywords should be **present in the title**

Use the **same keywords** that you use to find a **paper similar** to yours in a web browser

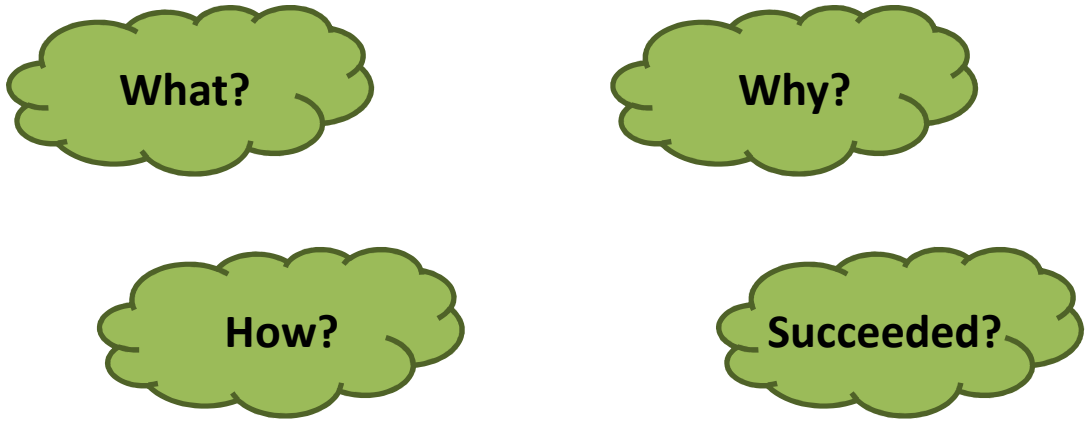
Check the **ACM Computing Reviews annual classification system** to gain insight on the use of keywords

Structure – Introduction

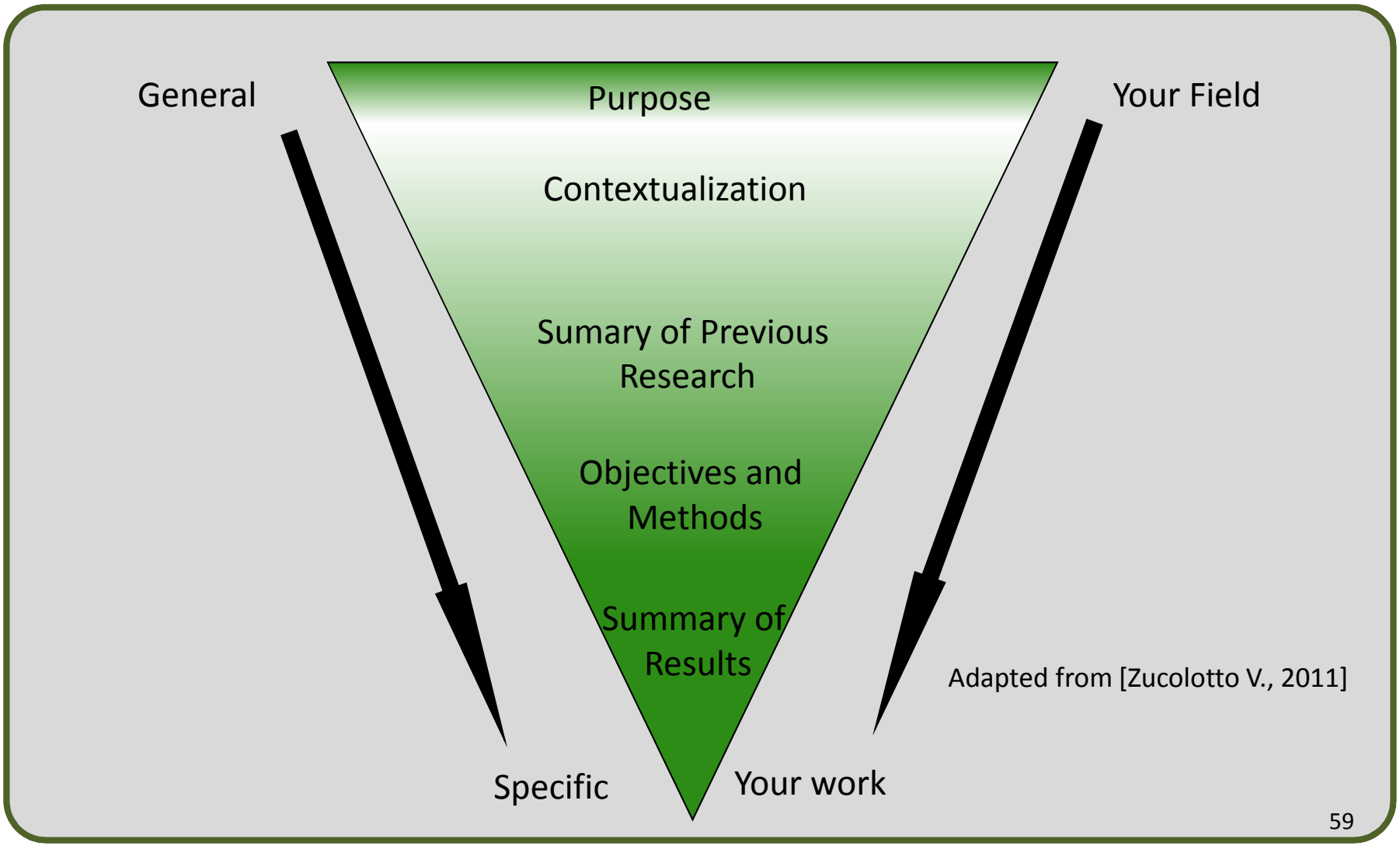
"The real purpose of introductions, of course, is to cite your own work, the work of your advisor, the work of your spouse, the work of a friend from college, or even the work of someone you've never met, as long as your name happens to be on the paper." [Schulman, 1996]

Structure – Introduction

- **Goals**
  - State the **purpose** of the paper
  - Give the **context** of the paper
  - Summarize your **contributions** to the field
- **How?**



Structure – Introduction



Structure – Introduction

- **How?**
  - Present your ideas flowing from **general to specific**
    - Except for the **immediate purpose statement**, at the very **first sentence**
  - Clearly **state the importance of the paper** to the **development of the field**
    - What are your **contributions** to the development of the field?
    - What's **new** in your work?
    - What **current limitations does your work overtakes**?
    - *[Indirectly state why you think your paper deserves to be published]*

Structure – Introduction

- **Structure**
  - **What? (brief)**
    - **Problem statement and main purpose**
      - Describe the problem you address in the paper
      - As in the abstract, use the **first sentence** for that purpose
      - Only then give background information

> The goal of this paper is to assess the feasibility to accurately extract the main systolic time intervals from heart sound.

Adapted from Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG" (this sentence was not the first one ☺)

Structure – Introduction

- **Structure**
  - **Why?**
    - **Motivation and scope**
      - Why do you address that problem? Why is it relevant to the field? What applications does this research problem have? What's the scientific, social, economic, cultural, etc. impact of addressing this problem?

Heart sound has emerged as a powerful (easy to use, low intrusive, repeatable and accurate) and inexpensive bio-signal to develop and deploy monitoring systems, mainly in the context of chronic disease management where low-cost and reliable solutions for cardiovascular function assessment are required for long-term patient follow-up.
This application scenario has been growing in importance since the past decades due to the rising incidence and prevalence of chronic cardiovascular diseases (WHO, 2005) as well as the unprecedented aging of the world population (Rechel *et al.*, 2009; United Nations) with a decrease in the number of working age per retiree.

From Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Structure – Introduction

- **Structure**
  - **Why?**
    - **Meaningful** and **critical literature review**
      - How is the problem currently being addressed?
        - » Most relevant works / exhaustive review
      - What limitations do you see in current approaches?
      - Sometimes in a sub-section (Literature Review or Related Work)

> Existing commercial and research biomedical systems using heart sounds are mainly supported by the analysis of the intensity and spectral content of the main heart sound components (e.g. (Debbal and Bereksi-Reguig, 2008; Eitz *et al.*, 2003; Xiao *et al.*, 2003; Durand and Pibarot, 1995)), in tasks such as noise detection (Kumar *et al.*, 2011) or heart sound segmentation (Schmidt et al., 2010; Ahlstrom *et al.*, 2008).

From Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Structure – Introduction

- **Structure**
  - **What? (more detailed)**
    - **Objectives**
      - Summarize the main and secondary objectives of the paper

> In this paper, the goal is to assess the feasibility to accurately extract the main systolic time intervals from heart sound.

Adapted from Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Structure – Introduction

- **Structure**
  - **How?**
    - **Hypotheses formulation**
      - What are your hypotheses for a (better) solution to the problem?

The underlying hypothesis is that the first and the second heart sounds encode mechanical activity (valve movements, blood flow, etc.) and that these components exhibit noticeable and specific signatures that enable their identification using this signal. To this end, we also follow the idea of combining HS and ECG.

From Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Structure – Introduction

- **Structure**
  - **How?**
    - **Overall Methodology**
      - How do you tackle the described limitations in the state of the art? → Briefly describe the overall methodology you propose

We introduce an algorithm for automatic extraction of PEP and LVET using HS and ECG. PEP is estimated with a Bayesian approach using to the signal's instantaneous amplitude and patient-specific time intervals between atrio-ventricular valve closure and aortic valve opening. As for LVET, since the aortic valve closure corresponds to the start of the S2 heart sound component, we base LVET estimation on the detection of the S2 onset.

Adapted from Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Structure – Introduction

- **Structure**
  - **Did your hypotheses succeed? → Brief evaluation**
    - **Summary of key findings**
      - Summarize the attained (quantitative) results
    - **Interpretation of main results**
      - Compare main results to the state of the art
      - Critical Analysis
        - » Briefly state the strengths and limitations of your work
    - **Summary of key contributions**
      - Summarize your main contributions to extend the state of the art
      - Why are these contributions useful and relevant to the scientific community working in the field?
  - **How is the paper structured? → Paper outline**
    - Briefly describe the main sections of the paper

Structure – Introduction

For the CVD population, 404 beats were used, leading to 11.86 ± 8.30 and 17.51 ± 17.21 ms absolute PEP and LVET errors, respectively. The results achieved in this study suggest that HS can be used to accurately estimate LVET and PEP.

The main contributions of this article are:

- To the best of our knowledge, the first non-intrusive method for PEP and LVET estimation based on heart sound
- Results above the state-of-the-art using other methodologies for both healthy and CVD popullations
- A dataset for PEP and LVET estimation

The remaining of the paper is organized as follows: in section 2 the algorithms for heart sound analysis are described. The data collection strategy is presented in section 3. In section 4, the main results are presented and discussed. Finally, in section 5 the main conclusions are presented.

Adapted from Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG" (in the original paper, the 1st sentence was in the abstract but not in the introduction ☺)

Structure – Introduction

Avoid **uncritical** listing of **related work**

Remember **you have other sections**!

- Focus your paper summary on **key information** (overview of the methodology, main results, key findings and conclusions)

Itemize

- List of contributions, objectives, key findings, etc.
  - Improves readability: reader doesn't get lost in the middle of dense text

Structure – Methodology

- **Goals**
  - Describe in detail the hypotheses and methodologies employed to tackle the problem
- **How?**
  - Describe the **originally proposed methods** (or significant modifications of older methods)
    - **Detailed description**
    - **Other known methods**
      - Reference or brief description might suffice

Structure – Methodology

- **How?**
  - Provide **full details**: don't leave "blanks" in the description of your method
    - It is useful if someone unfamiliar with your work reads it
  - Make your paper as **self-contained** as possible (depending on the space you have)
    - This is especially true for journal papers
  - **Structure this section**: use **sub-sections** according to the different components of your method

Structure – Methodology

- **How?**
  - Do **not be overly textual**. Give **support** to your description with
    - **Illustration diagrams** to visually summarize the methodologies
    - **Algorithms** to systematize the steps of your method
    - **Equations** to mathematically compress and quantify your descriptions
    - **Tables** to summarize employed parameters

Structure – Methodology

2. Methodology

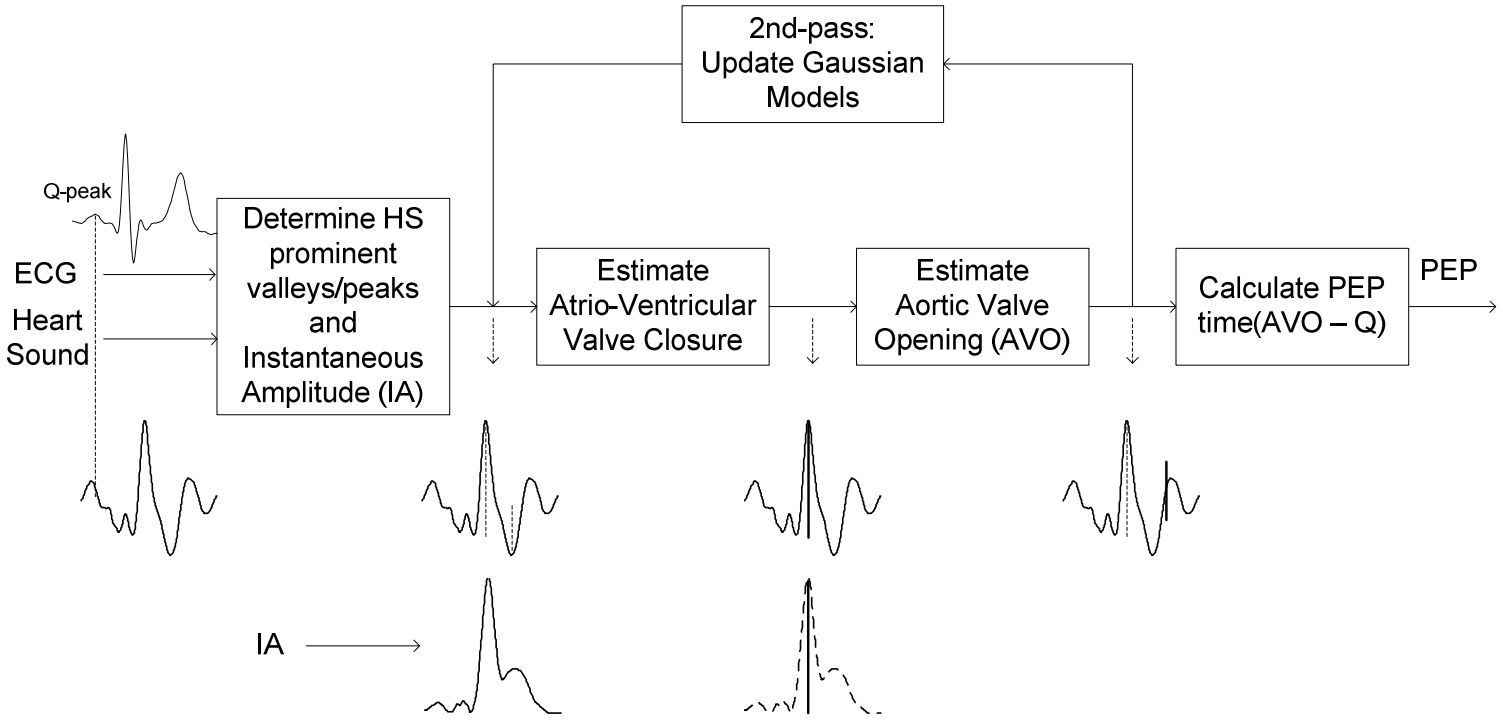


Figure 1. Overview of the proposed PEP estimation approach.

From Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Structure – Methodology

Algorithm 1. Elimination of ghost octave notes.

1. Sort all notes in ascending onset time order.
2. For each note, *i*,
    2.1. Look for a note, *j*, such that:
        a)(|onset(*i*) – onset(*j*)| ≤ *maxOnsetDist* or |ending(*i*) – ending(*j*)| ≤ *maxOnsetDist*) and
        b) |MIDI(*i*) – MIDI(*j*)| = 12*k* or 12*k* ± 1 and
        c) the two notes have parallel changes in frequency and salience.
    2.2 If note *j* was found,
        2.2.1. Compute the average salience of the two notes in their common time interval, avgSal.
        2.2.2. If avgSal(*j*) / avgSal(*i*) ≤ 0.4/*k* then delete note *j* and repeat step 2.1 until no more notes are found.
        2.2.3. If avgSal(*i*) / avgSal(*j*) ≤ 0.4/*k* then delete note *i* and repeat step 2 for the next note.

From Paiva *et al.*, 2006, "Melody Detection in Polyphonic Musical Signals: Exploiting Perceptual Rules, Note Salience and Melodic Smoothness"

Structure – Methodology

Table 1. Pitch trajectory construction parameters.

Parameter Name	Parameter Value
maxSTDist	1 semitone
maxSleepLen	62.5 ms
minTrajLen	125 ms

From Paiva *et al.*, 2008, "From Pitches to Notes: Creation and Segmentation of Pitch Tracks for Melody Detection in Polyphonic Audio"

$$p(\mathrm{AV}_k|\mathrm{prom}_k, \mathrm{IA}_k, \mathrm{AV}_{k-1}) \approx p(\mathrm{AV}_k|\mathrm{prom}_k) \cdot p(\mathrm{AV}_k|\mathrm{IA}_k) \cdot p(\mathrm{AV}_k|\mathrm{AV}_{k-1}). \quad (2)$$

From Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Structure – Methodology

Focus this section on the **how** question

Start with an **overall diagram** that synthesizes the whole method

- Then, structure the methodology section according to the components in that diagram

Remember **readers** should be able to **replicate your work**

- Provide **full details**

Remember **reviewers** should be able to **evaluate your work**

Structure – Methodology

Avoid showing results here

Be **sequential** and **linear**

- Try to describe logical and linearly your approach

Be **rigorous**

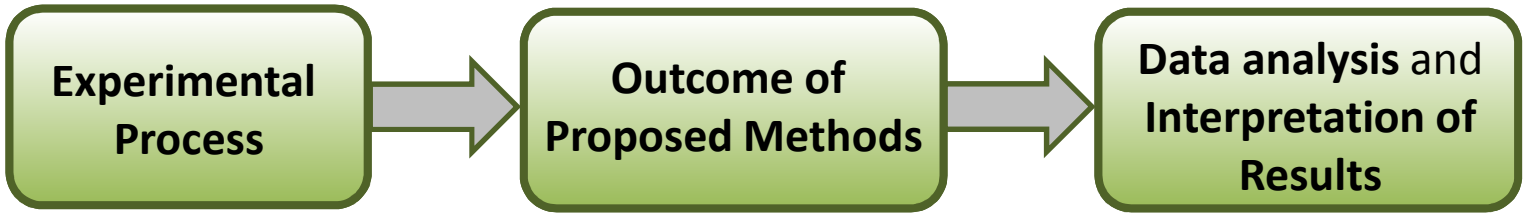
- Make sure your methodology doesn't have mathematical flaws, erroneous text, mistakes in diagrams, algorithms or equations

Be **explicit**

- Avoid ambiguities in the description, be specific

Structure – Results and Discussion

- **Goals**
  - The section where you **prove your initial question**, hypothesis, idea, **highlight the important findings**
- **How?**



Structure – Results and Discussion

- **How?**
  - Suggested structure: progress **from general to specific**
    1. Describe the **experimental process**
       - E.g., data acquisition process and protocols, ethical procedures for research with humans, etc.
       - Characterize the employed population (people: age, sex, weight; music: genre, style, duration, etc.)
         - » Justify the choice of that population

Structure – Results and Discussion

3.1 Experimental Setup

(…)

As for the CVD population, this one is more balanced for gender, as 8 male and 4 female patients volunteered. The average HR during data collection was 70.1 ± 11.3 bpm. The biometric characteristics of the CVD population were:

- Age: 55.7 ± 18.4 years
- BMI: 25.6 ± 3.3 Kg/m2

The annotations of the opening and closing instants of the aortic valve were performed using the echocardiographies by an experienced clinical expert. The opening instant of the aortic valve was annotated as the onset of the ejection lobe of the left ventricle, while the closing point was defined immediately before the onset of the closing click produced by the residual reflux after the aortic valve cusps have closed, as can be observed in figure 6.

From Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Structure – Results and Discussion

The measurement protocol was conducted by an authorized medical specialist and consisted of several acquisitions of echocardiography in Doppler mode and heart sound collected at the left sternum border (LSB). More precisely the following steps were carried out:

- The patient was set in supine position, turned left (approximately 45º) – the usual echo observation position for the aortic valve.
- The echo was configured for Doppler-mode and the stethoscope was positioned in the LSB region.
- Runs of 30-60 sec. data acquisitions of HS, Echo and ECG were performed repeatedly.

The following signals have been acquired:

- Echocardiography and ECG have been acquired using a Vivid system from General Electric. This device produces outputs with images of 500 Hz time resolution (see figure 6).
- Heart Sounds and ECG: a Meditron Stethoscope and Analyzer were applied to record HS and ECG at 44.1 kHz. The bandwidth of the HS sensor is 20 kHz.

From Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Structure – Results and Discussion

- **How?**
  - Suggested structure: progress **from general to specific**
    2. Show rigorously the **outcome of the proposed methodologies**, simulations, calculations, …

3.3. Results and Discussion

The main results obtained in this study are summarized in tables 1 and 2, for the healthy and CVD population, respectively. The achieved results suggest that it is possible to accurately identify the systolic time intervals using HS.

Table 2. Summary of results: CVD population.

Parameter	Annotated range (ms) (average ± std)	Estimation error (ms) (average ± std)	ρ
PEP	77.77 ± 17.61	11.86 ± 8.30	0.68
LVET	292.96 ± 32.68	17.51 ± 17.21	0.83

Adapted From Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Structure – Results and Discussion

- **How?**
  - Suggested structure: progress **from general to specific**
    3. Perform **thorough data analysis** and **interpretation of results**
       - **Compare your results** to the state of the art
         - » Either agreeing or disagreeing
       - Prove the **validity of results using statistics**
         - » E.g., significance tests
       - Perform **critical analysis** of your findings
         - » Give **reasons for observed facts**
           - Why the results are not so good for those particular samples or that particular method?
           - **Relate observed facts**

Structure – Results and Discussion

In fact, in a comparative study carried out by the team (Carvalho *et al.*, 2010), PEP estimation error using the proposed heart-sound-based algorithm was 27.4% lower than the best performing ICG-based approach

Regarding the healthy population, 942 annotated heartbeats were acquired. For PEP estimation, 7.67 msec absolute average error, with 5.92 msec standard deviation, resulted, i.e., 9.97% ± 7.7%, relative to the average PEP values (76.86 msec), annotated from the echocardiography. Moreover, 0.51 Pearson's correlation (ρ) between annotated and estimated PEP values was obtained (this was applied as both distributions are Gaussian, from the Kolmogorov-Smirnov test; also, p-values were very low, permitting to discard the null-hypotheses of no correlation).

As for the CVD population, 404 beats were annotated. In terms of PEP estimation, 11.86 msec absolute average error, with 8.30 msec standard deviation resulted, i.e., 15.25% ± 10.67%, relative to the average annotated PEP values (77.77 msec). In addition, 0.68 correlation was attained. Comparing to the healthy population, a higher estimation error is observed. This is mostly consequence of a more complex sound signal morphology in this population, resulting from higher average BMI, age and blood flow issues related to the patient condition. For instance, body fat acts like a low-pass filter as well as a gain attenuator for heart sound.

From Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Structure – Results and Discussion

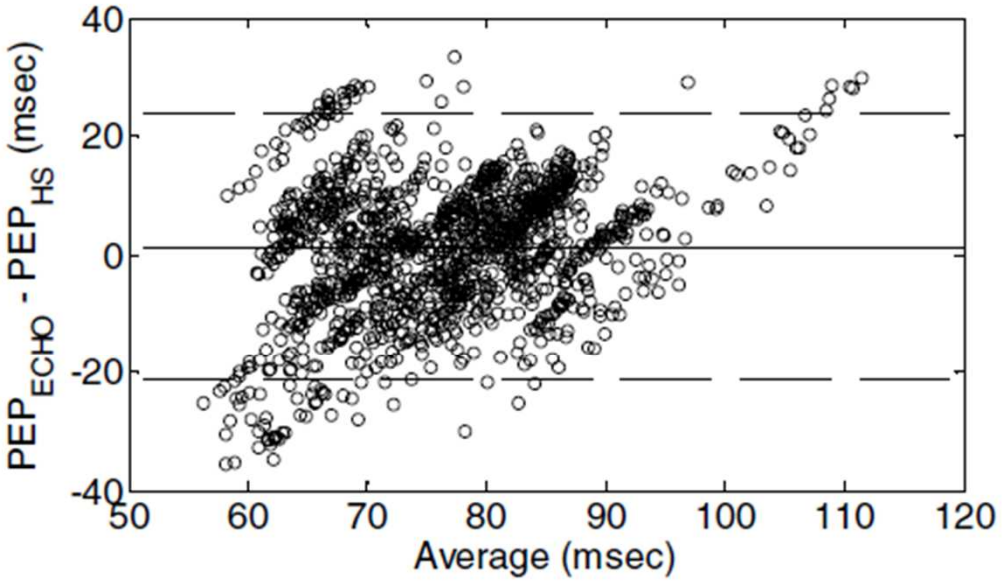


Figure 8. Bland–Altman scatter plot of the estimated beat-to-beat PEP estimation with respect to echocardiography annotation $(PEP_{ECHO} + PEP_{HS})/2$.

From Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Structure – Results and Discussion

- **How?**
  - Suggested structure: progress **from general to specific**
    3. Perform **thorough data analysis** and **interpretation of results**
       - Give **evidence of generality**
         - » Among evaluated methods, relationships in observations, parameterization, etc.
           - E.g., perform **parameter sensitivity analysis**
       - Address the **strengths and limitations** of your work (before the reviewers do so)
       - Discuss the **theoretical implications** of your work

This is probably the **hardest part of the paper to write**!

Structure – Results and Discussion

To assess the sensitivity of the algorithm to parameter variations, the results using different initial Gaussian models and only one pass of the algorithm were evaluated. Therefore, the mean difference between AV closure and aortic valve opening was varied up to ±15 msec from the nominal value. Also, the standard deviations of all Gaussians were varied in the same range. As for the standard deviations, these had nearly null impact in the results: the maximum observed average error was 9 msec. Regarding variations of the mean, these had a more significant impact on the results as expected: a 45-msec mean average value led to 14.1 msec error. Thus, the achieved results seem to confirm Tavel's indication that the aortic valve opens typically 30 msec after the closure of AV valves. c

Although our results suggest that heart sound might lead to better STI estimation accuracy, the estimated average PEP error could be a clinical issue. In fact, the achieved 15.25% ± 10.67% average estimation error may lead to inaccurate estimation of cardiac function parameters such as stroke volume or contractility. We conducted a study on the estimation of such parameters based on the systolic time intervals estimated from heart sound (Couceiro *et al.*, 2011). In terms of stroke volume, preliminary results indicate 10 ± 9% estimation error, a value substantially below the clinically accepted error of 30% (Critchley and Critchley, 1999).

From Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Structure – Results and Discussion

- **How?**
  - **Form**
    - Use **accurate, descriptive text**
    - Reinforce message using **illustrative materials** (figures, tables)
      - → improve readability
      - Use **tables**
        - » To **summarize results**
        - » To **compare results** from different approaches
    - Use **figures**
      - To **illustrate results**
    - Describe only the **most important results**
      - Excessive detail may distract the reader

Structure – Results and Discussion

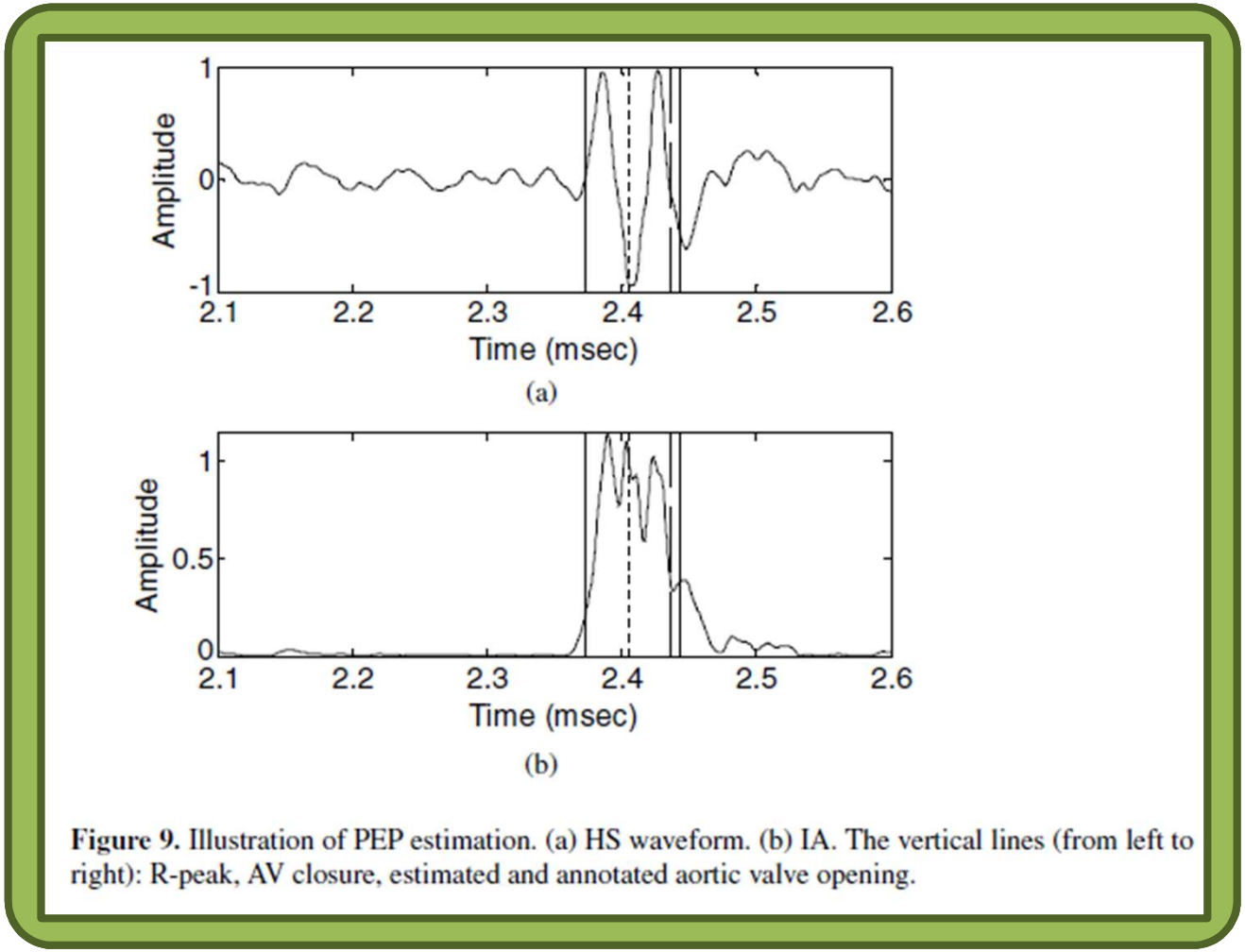


Figure 9. Illustration of PEP estimation. (a) HS waveform. (b) IA. The vertical lines (from left to right): R-peak, AV closure, estimated and annotated aortic valve opening.

From Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Structure – Results and Discussion

The **way you write your achievements** makes the whole difference!!!

- Highlight what is new, how you extend the state of the art
- Identify weaknesses

Never overlook the discussion

- Don’t simply show results: critically discuss them

Focus this section on the **how much** and **why** questions

Structure – Results and Discussion

Order your results logically

- Start with the most important ones
- Or order chronologically, etc.

Figure and table quality is fundamental

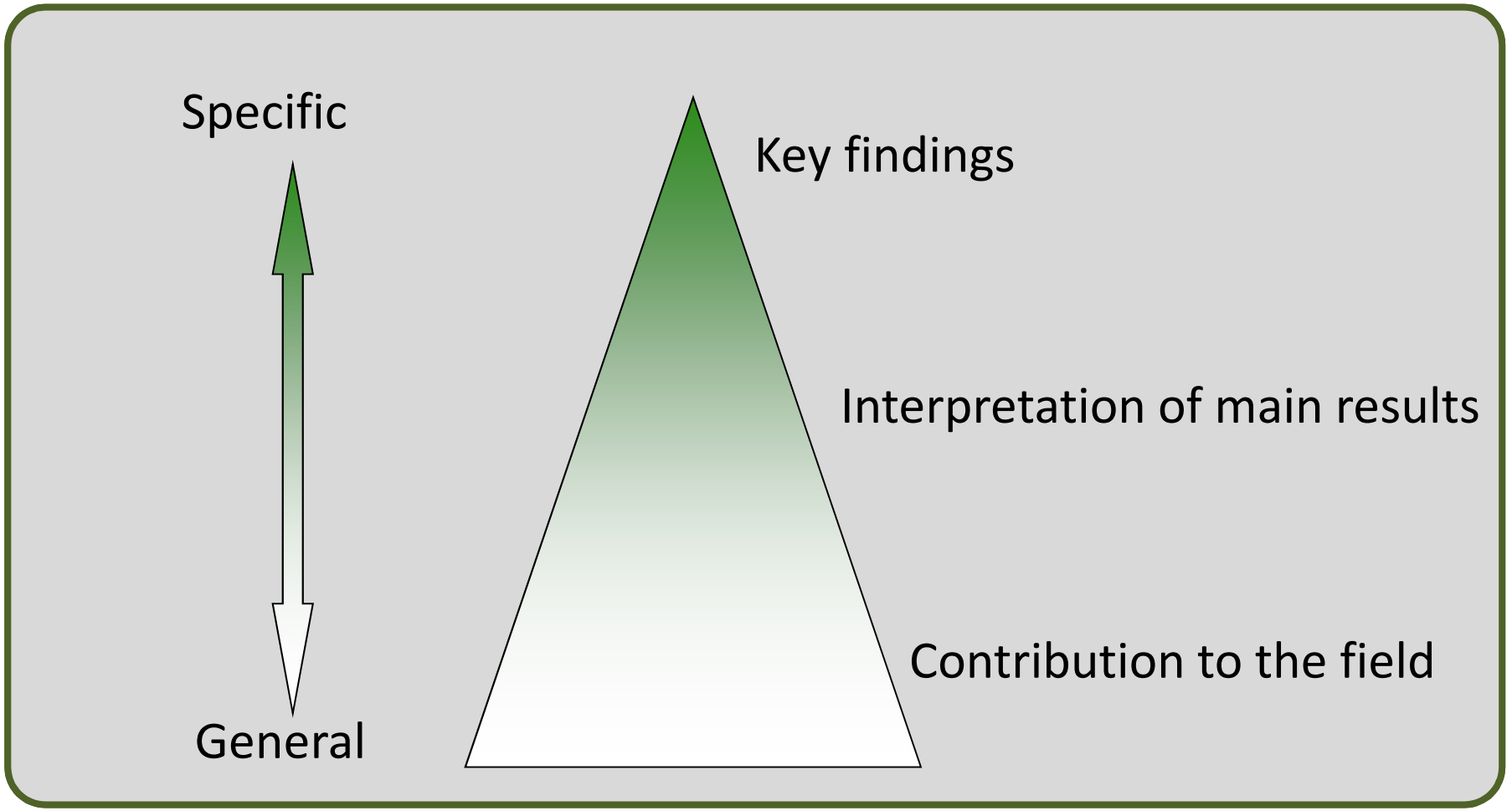
Use **figures that support statistical analysis**, e.g., scatter plots, precision-recall curves, confusion matrices, etc.

Structure – Conclusions

- **Goals**
  - **Summarize your contributions** to the field
  - Propose possibilities of **future work**

"The conclusion section is very easy to write: all you have to do is to take your abstract and change the tense from present to past." [Schulman, 1996]

Structure – Conclusions



From [Zucolotto V., 2011]

Structure – Conclusions

- **How**
  - Present your ideas flowing from **specific to general**
    - The reverse of the introduction
  - Again, clearly **state the importance of the paper** to the **development of the field**
    - What are your **contributions** to the development of the field?
    - What's **new** in your work?
    - What **current limitations does your overtakes**?
    - *[Indirectly state why you think your paper deserves to be published]*
  - Use the identified limitations to propose hypotheses for **future work**

Structure – Conclusions

- **Structure**
  - **Did your hypotheses succeed?**
    - **Summary of key findings**
      - Summarize the attained (quantitative) results
    - **Interpretation of main results**
      - Briefly compare results to the state of the art
      - Critical Analysis
        - » Briefly state the strengths and limitations of your work
  - **Summary of contributions**
    - Summarize your **contributions to extend the state of the art**
    - **Why are these contributions useful** and relevant to the scientific community working in the field?
    - State the **theoretical implications** of your work
    - Discuss possible **practical applications**

Structure – Conclusions

- **Structure**
  - **What to do in future?**
    - Summarize your ideas for future work, research possibilities, fields to explore, etc., to overtake the current limitations of your proposal
      - **Identified limitations** of your work should support this part

Structure – Conclusions

5. Conclusions

This paper investigates the possibility of using heart sounds to accurately measure the main systolic heart time intervals, i.e., the pre-ejection period and the left ventricle ejection time. The working hypothesis is that heart sounds encode makers that enable the detection of the opening and closing of the aortic valve. To evaluate this hypothesis a comparative echocardiography-heart sound study was conducted on 23 healthy and 12 CVD subjects. An automated heart sound annotation algorithm for the detection of the aortic valve events was described. PEP was estimated following a Bayesian approach where the instantaneous amplitude of the heart sound and the typical delay between aortic valve opening and atrio-ventricular valve closure were employed as the main features. Regarding LVET, sound segmentation was performed (based on the application of the Shannon energy operator to the detail coefficients of the Fast Wavelet Transform) and segments near the peak of T-wave are taken as S2 sound candidates.

The obtained results strongly support the view that heart sound can be applied to detect the onset of the aortic valve movement processes. This seems to be a significant achievement since other competing approaches for LVET and PEP measurement (e.g. the ICG approach) tend to exhibit biases in the estimation of those moments, leading to possible inaccuracies in cardiac function assessment. In fact, as already mentioned, there is ample evidence that ICG does not enable a precise detection of the onset of the aortic valve opening and closing process (Ermishkin *et al.*, 2007; Carvalho *et al.*, 2010).

The main current limitation of the proposed method pertains to PEP estimation as the opening of the aortic valve is more difficult to detect than its closure. Nevertheless, a recent study (Couceiro *et al.*, 2011) suggests that cardiac parameters, namely stroke volume, estimated based on the STIs obtained from the present method, provide sufficient clinical accuracy.

In the future, we plan to perform hemodynamic assessment for several distinct cardiovascular diseases, studying the impact of using heart sound and other competing approaches, namely the ICG-based and PPG-based methodologies, on several application scenarios (hospital, phealth, etc.).

From Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Structure – Conclusions

Useful starters:

- "We have used…", "This paper investigates…"
  - Directly say what the paper does.

Be **concise** and **objective**

Structure – Acknowledgements

- **Goals**
  - **Acknowledge people and institutions** that contributed to or financed your work, whose contribution was not so extensive as to have them as co-authors

It’s crucial to thank your wife, children, primary school colleagues, soccer fellows, your cat and your dog.

Structure – Acknowledgements

- **How?**
  - People who had a **small**, yet, **meaningful contribution**
    - E.g., meaningful discussions, document review, technical support, participation in data collection, etc.
    - Short list: Only the most important ones or maybe just a general reference
  - **Financing institutions**
    - Grants, scholarships, contracts, etc.
  - **Projects** under which the work was developed

Structure – Acknowledgements

Acknowledgments

This work was supported by the European Integrated Project HeartCycle (FP7 – 216695) and SoundForLife (PTDC/EEA-ACR/68887/2006). The authors want to express their gratitude to the volunteers who participated in this study. The authors would also like to recognize and to express their appreciation to the Centro Hospitalar de Coimbra for supporting the study.

From Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Structure – Acknowledgements

Avoid the classical "I wish to thank" starting

- Simply write "I thank …"

Some financing institutions **demand that you acknowledge** them

- With impact on project evaluation

Structure – References

- **Goals**
  - **Acknowledge the sources of information** and ideas that you have used in your document
    - Authors cite to prove where the **ideas** came from
      - All information or ideas must be referenced!
        - » Including your own work!
  - **Avoid plagiarism**, promote **scientific rigor**, give **credibility** to your work
  - Allow readers to **investigate the subject** in greater depth

Structure – References

- **How?**
  - **List** papers, books, bibliographic elements and sources of information that you used
  - **2 main styles**
    - **Vancouver** style: **numeric** style
      - References are numbered sequentially
      - Order: either alphabetical or citation order style
        - » **Alphabetical order**: references numbered according to an alphabetical order (by author's names)
        - » **Citation order**: references numbered in the order they are mentioned in the text
    - **Harvard/APA** style: **name and year** style
      - APA: American Psychological Association
      - References are listed alphabetically according to the name of the first author, without numbering

Structure – References

Vancouver style

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[1] D. Huron, "Perceptual and Cognitive Applications in Music Information Retrieval", International Symposium on Music Information Retrieval, 2000.
[2] A. Friberg, “Digital Audio Emotions - An Overview of Computer Analysis and Synthesis of Emotional Expression in Music”, in Proc. 11th Int. Conf. on Digital Audio Effects, 2008, pp. 1-6

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From Panda and Paiva, 2012, “Music Emotion Classification: Dataset acquisition and Comparative Analysis”

Structure – References

Harvard / APA style

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Xiao S, Guo X, Wang F, Xiao Z, Liu G, Zhan Z and Sun X 2003 Evaluating two new indicators of cardiac reserve *IEEE Engineering in Medicine and Biology Magazine* **4**:147-152c

From Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Structure – References

- **How?**
  - **Formatting conventions**: depends on the publication
    - IEEE, ACM, specific of the conference/journal/editor to which you submit
      - Specify the order and format of the common fields (authors, year, paper title, conference/journal title, volume, number, page, etc.
  - Prefer references with **good credibility**
    - E.g., most recognized authors, reference papers, etc.
  - Use **up to date** references, as well as **historical** references, if needed
  - Use **references only for the ideas that need support**
  - **Avoid self-citations**
    - Except where your past work supports the current one

Structure – References

- **In-text citations**
  - Cite others' words, data, etc., using **your own words**
    - **Avoid paraphrasing** other author's text
    - Do not paraphrase your early papers

Structure – References

- **In-text citations**
  - Again, **2 main styles**
    - **Vancouver** style: **numeric** style
      - [number]
      - Benefits: more compact, text easier to read (papers with limited space, e.g., conferences)

… empirical studies starting in the 19th century [8].

    - **Harvard/APA** style: **name and year** style
      - (authors, year)
        - » 2 authors: both last names are written
        - » More than 2 authors: only first author's name followed by the abbreviation *et al*.
      - Benefits: source identity easier to identify (papers with fewer space constraints, e.g., journals)

… a recent study (Couceiro *et al*., 2011) suggests …

    - Others,
      - E.g., [code]

… as shown in [Gom07].

Structure – References

- **In-text citations**
  - You **CAN** use citations in the middle of sentences
    - Don't put all the citations in the end
  - Citing **books**
    - If possible, add **page numbers**
    - Otherwise, information will be buried
  - Citing **webpages**
    - Add the **URL**
    - Add the **last consulted date** (webpages change…)
  - Citing **unread sources**
    - Mention it is **cited in another reference** you read
      - E.g., [Schaars, 1936, cited in Nilsson, 2004]

Structure – References

- **Plagiarism**
  - Conferences and journals have strict norms
  - Unethical and bad consequences to your reputation
  - **Repetitive publication** of the same methods, experiments, data, etc. is considered plagiarism

Structure – References

Carefully review your references (especially years)

Send your paper with **references in the desired format**

- Details on how to format different types of documents (books, book chapters, journal papers, conference papers, etc.)

Any papers **not cited** in the text should **not be included**

Prefer references with **good credibility**

- E.g., most recognized authors, reference papers, etc.

Structure – References

Too many references may indicate **lack of capacity to discern essential** from accessory

Cite recognized authors to **support your claims**, not because they are famous

Reference list vs bibliography

- Reference list contains **only the materials that are cited** in the document
- Bibliography includes **all sources consulted for background or further reading**

Structure – Other Possibilities

- **Depending on the paper, you might have the following possibilities**
  - Glossary
  - Short curriculum vitae (CV)

[redacted] was born on [redacted] in [redacted]. He received the B.S. and Ph.D. degrees in computer and information science from National Chiao Tung University, Hsinchu, Taiwan, in 1991 and 1995, respectively.

He is currently an Associate Professor in the Department of Computer Science and Information Engineering, Chung Hua University, Hsinchu. His main research interests include audio/sound classification, multimedia information retrieval, and image processing.

From Lee *et al.*, 2012, "Automatic Music Genre Classification Based on Modulation Spectral Analysis of Spectral and Cepstral Features"

Structure of a Scientific Paper

Further reading

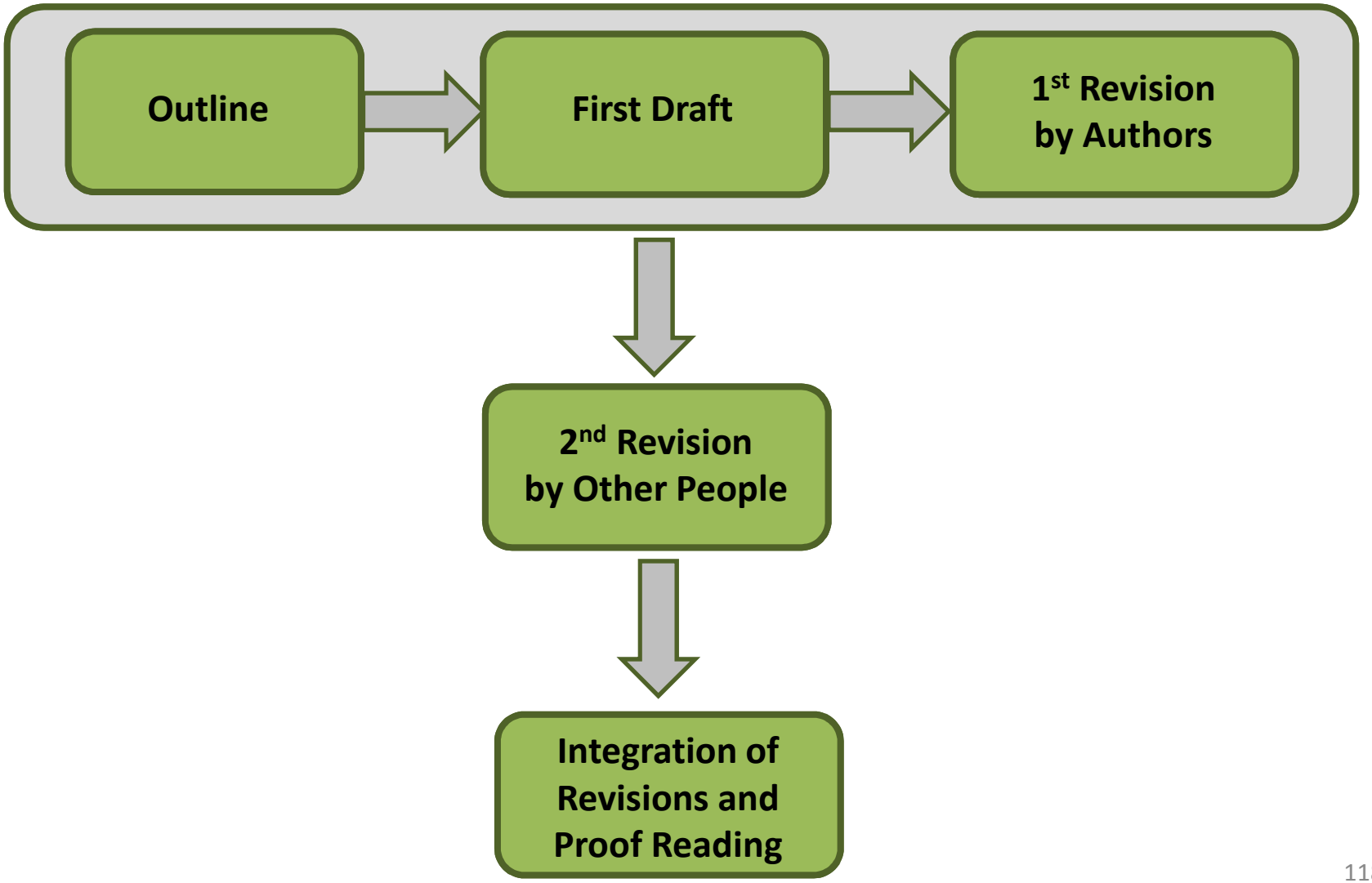
- Main
  - Day R. (1998). “How to write and publish a scientific paper”, 5th Edition, Cambridge University Press
  - Glasman-Deal H. (2009). “Science Research Writing for Non-Native Speakers of English”, Imperial College Press
  - Peat J., Elliott E., Baur L. and Keena V. (2002). “Scientific Writing, Easy When You Know How”, BMJ Books
- Additional
  - Aston University (2007). “An introductory guide to citing references”, Technical Report, Aston University, Library & Information Services, URL: http://www1.aston.ac.uk/EasySiteWeb/GatewayLink.aspx?alId=34645
  - Sollaci L.B. and Pereira M. G. (2004). “The introduction, methods, results, and discussion (IMRAD) structure: a fifty-year survey”, J Med Libr Assoc., Vol. 92, No.3, pp 364–371.
  - Hill et al. (1982). “Teaching ESL students to read and write experimental papers”, TESOL Quarterly, 16: 333

Writing Sequence

Writing Sequence

- **Goal**
  - Follow a **productive writing strategy**
- **How?**
  - Follow a **divide-and-conquer approach**
    - **Outline** and general ideas **first**
    - **Successive detail later**
  - Write **out of order**

Writing Sequence



Writing Sequence

- **Outline**
  - **Major headings**
  - **Key ideas and topics** to cover

Writing Sequence

PEP and LVET Estimation from Heart Sounds
Authors

Abstract. To write in the end

1. Introduction
Problem statement
Context and motivation
- Why STI estimation?
  - Clinical relevance, etc.
- Cardiac auscultation, lack of current doctor's proficiency, advances inn audio signal processing
- Heart sounds: how they are formed, characterization, etc.

State of the art review
- Current solutions for STI estimation
  - Commercial
  - Research

Objectives
Overall Methodology
Summary of results
Paper organization

From Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Writing Sequence

2. Methods

2.1.PEP Estimation

Figure with overall methodology

2.2 LVET Estimation

Same scheme employed in PEP

3. Data Collection

Characterize populations and diseases

Describe measurement protocol

Describe data acquisition process

Describe data annotation

4. Results and Discussion

Show results for healthy and CVD populations separately, as well as overall

4.1 PEP Estimation

Present and discuss in detail PEP results

Statistical analysis

Scatter plots

4.2 LVET Estimation

The same

5. Conclusions

Summarize

List limitations and suggestion for future improvements

Acknowledgments

HeartCycle, SoundForLife, Hospital

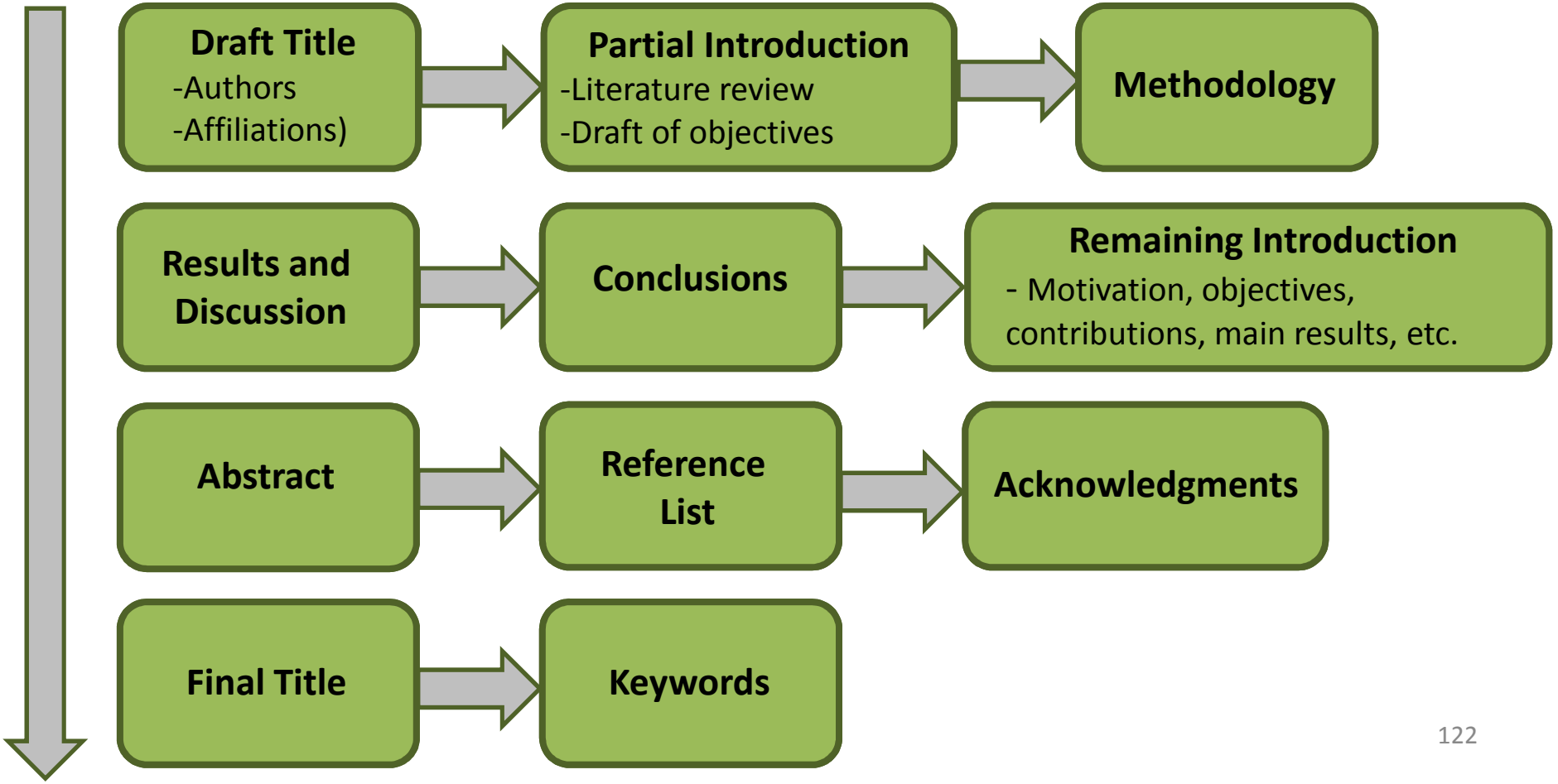
References

To add while writing

From Paiva *et al.*, 2012, "Beat-to-beat systolic time-interval measurement from heart sounds and ECG"

Writing Sequence

- **First Draft**



Writing Sequence

- **1st Revision by Authors**
  - Extensive review of the document
    - Focus on content
      - Methodology, results and discussions, literature review, abstract and title (by that order)
- **2nd Review by Other People**
  - Invite people that did not collaborate on the paper

(More about this on the section **"Reviewing your Document"**)

Writing Sequence

- **Integration of revisions and proof reading**
  - **Discuss** with your "invited reviewers" and **integrate the proposed changes**
  - **Proof read**
    - Typos, grammar, numbering (sections, equations, tables, algorithms and figures), captions, reference list, in-text citations, etc.

Good writing is **iterative**

- Don't expect to have a perfect document at first attempt

Writing Style

- **Basic Requirements**
- **Other Requirements:**
  Readability, Specificity, Rigor and Strength, Conciseness
- **Visual Elements**
- **Numbering**
- **Other Tips**

Writing Style

The life purpose of your supervisor is to teach you basic grammar and spelling.

Writing Style

- **Key Idea**
  - Scientific writing is a **kind of literary genre**
    - Its only style, rhythm, organization, etc.

It is **not like writing a novel**: reader wants **clarity and objectivity**, not suspense and flashback

Writing Style

- **Goals**
  - Write an **appealing text** that **"sells" your work** well
    - Not enough to just have a good research idea, sound methodology and evaluation of results
- **How?**
  - Follow guidelines for scientific writing (see next)

Bad writing can mask a brilliant idea

- Unfortunately, the reverse is usually untrue

Writing Style – General Rules

- **Clarity**
  - Key in scientific writing
- **Grammatical correctness**
- **Scientific accuracy**
- **Organization**

Writing Style – Readability

- **Goals**
  - Write **organized**, **readable** text
- **How**
  - Present your ideas **sequentially**
    - Use **cause-effect style of writing**, sequential flow of ideas
    - Avoid going back and forth in your arguments
  - **Avoid too long sentences**
    - **One basic idea per sentence**
      - Your text will be more structured and, therefore, more readable
  - Use **active voice**
    - More readable than the passive voice

Writing Style – Readability

Sentences **full of commas** or **spanning several lines** generally indicate **bad sentence construction**

Structure your writing according **to units of thought**: that's what paragraphs were made for!

Writing Style – Specificity

- **Goals**
  - Be **specific** while explaining your views
    - Accurately state what you mean
- **How?**
  - Use specific, **"right-to-the-point" sentences**
    - Avoid vague, too general, sentences

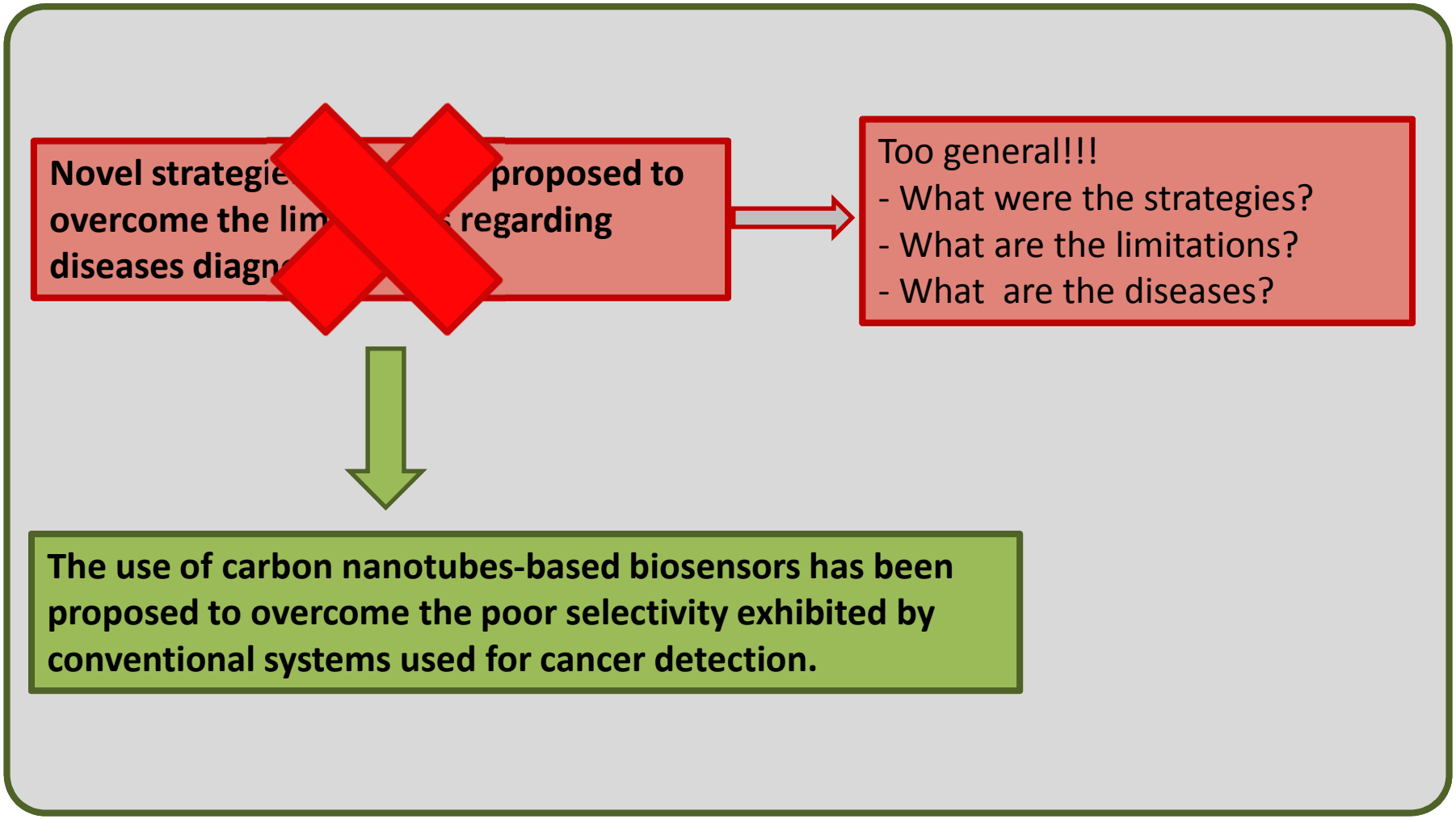
Writing Style – Specificity

Novel strategies have been proposed to overcome the limitations regarding diseases diagnosis.

Too general!!!
- What were the strategies?
- What are the limitations?
- What are the diseases?

From [Zucolotto V., 2011]

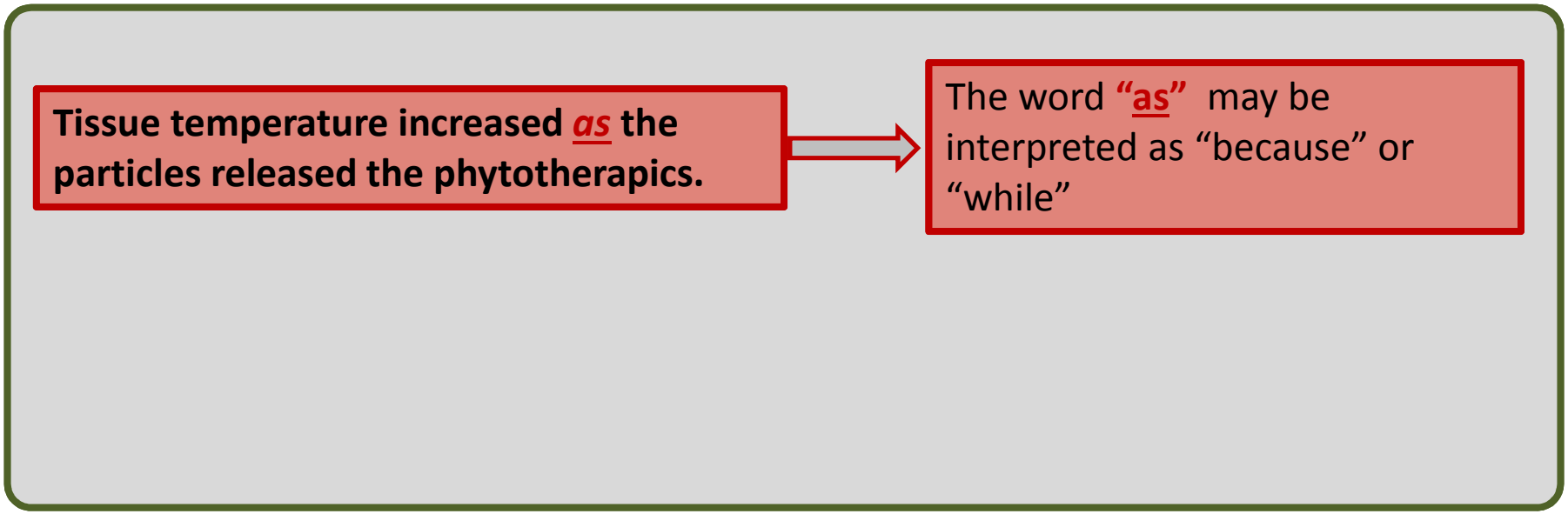
Writing Style – Specificity



From [Zucolotto V., 2011]

Writing Style – Specificity

- **How?**
  - Use specific, **"right-to-the-point" words**/expressions
    - Avoid ambiguous words



From [Zucolotto V., 2011]

Writing Style – Specificity

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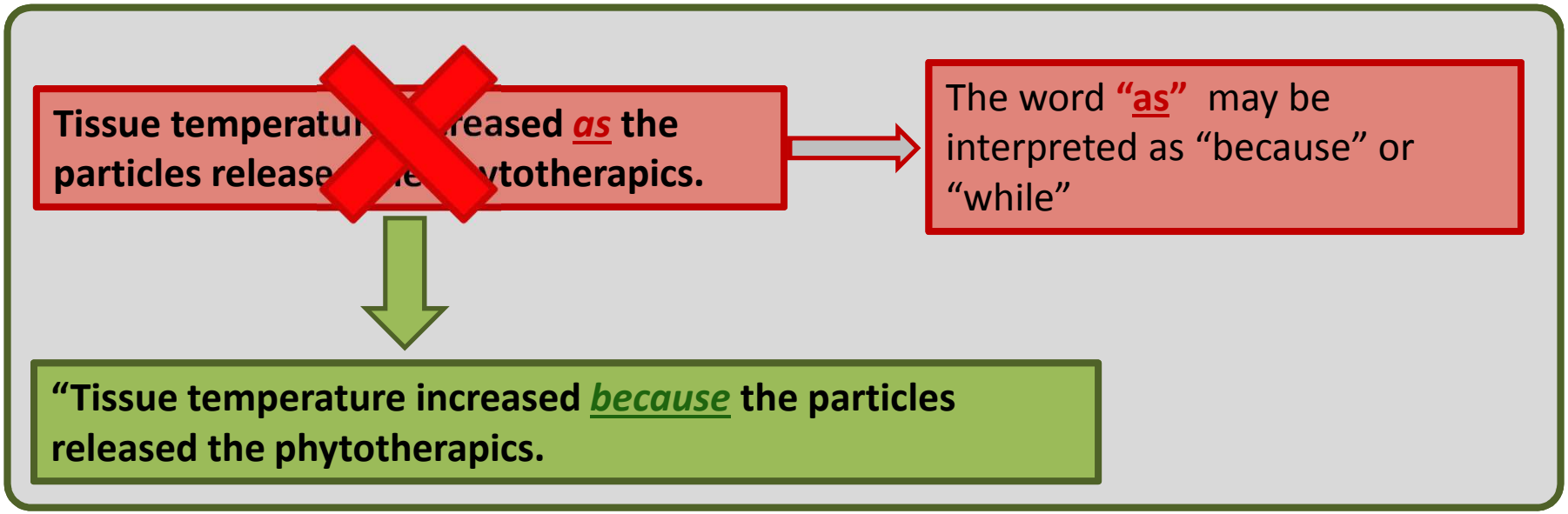
  - Use specific, **"right-to-the-point" words**/expressions
    - Avoid ambiguous words



From [Zucolotto V., 2011]

Writing Style – Rigor and Strength

- **Goals**
  - Strongly **support your arguments**
- **How?**
  - **Prove what you say**
    - Use references, mathematical proofs, your data, etc. to support your claims

Writing Style – Rigor and Strength

We applied subtractive clustering because it is the **most effective clustering technique**.

We applied subtractive clustering subtractive clustering because it **performed best in our experiments**, in comparison to k-means and GMMs. *[and then show the results, e.g. table]*

It is **generally accepted** that SVMs outperform most machine learning techniques in music classification tasks.

There is **extensive literature** on the evaluation of machine learning techniques for music classification tasks **[1, 3-5, 6]** supporting the claim that SVMs outperform most methods.

Writing Style – Rigor and Strength

Avoid sentences like **“I think”**, **“It was always believed”**, **“It may/might be”**

- Except for future work, where you might speculate

Eliminate **value judgments**

- “Surprising”, “interesting”, “unfortunately”

Every sentence of your paper must be backed by facts or research, **not by opinion**

Writing Style – Conciseness

- **Goals**
  - Say more using fewer words
- **How?**
  - Use **as few words as necessary**
    - Pay attention to unnecessary words and sentences

The limited results attained in the prediction of valence are a consequence of lack of relevant features.

17 words
89 characters (without spaces)
105 characters (with spaces)

The lack of relevant features leads to limited performance in valence prediction.

12 words
70 characters (without spaces)
81 characters (with spaces)

Writing Style – Conciseness

- **How?**
  - Prefer **short words**/expressions
    - Utilize → use
    - However → but
    - In order to → to
  - **Don't be redundant**, repetitive
    - Unless it improves clarity, e.g., main results appear in several places

Writing Style – Conciseness

Try to **compress your paper by, say, 5%**; repeat until you cannot compress any longer, but keeping **coherence** and **completeness**

- Your paper will be much clearer and more readable
- You'll find out that extra detail was not so important: you will focus on the **relevant stuff**

Writing Style – Visual Elements

- **Goals**
  - **Summarize and reinforce** your message
  - **Promote readability** and attractiveness
- **How?**
  - Use **illustrations, tables, algorithms, equations**
    - One example is worth a thousand words…
  - Should have **strong visual impact**
    - Many readers tend to ignore the text and focus on these visual elements
  - Should be **informative** and **easy to understand**
    - Should be understandable without reading the text
      - **Captions should be self-contained**, i.e., provide enough information so that users don't need to look for info in the text)

Writing Style – Visual Elements

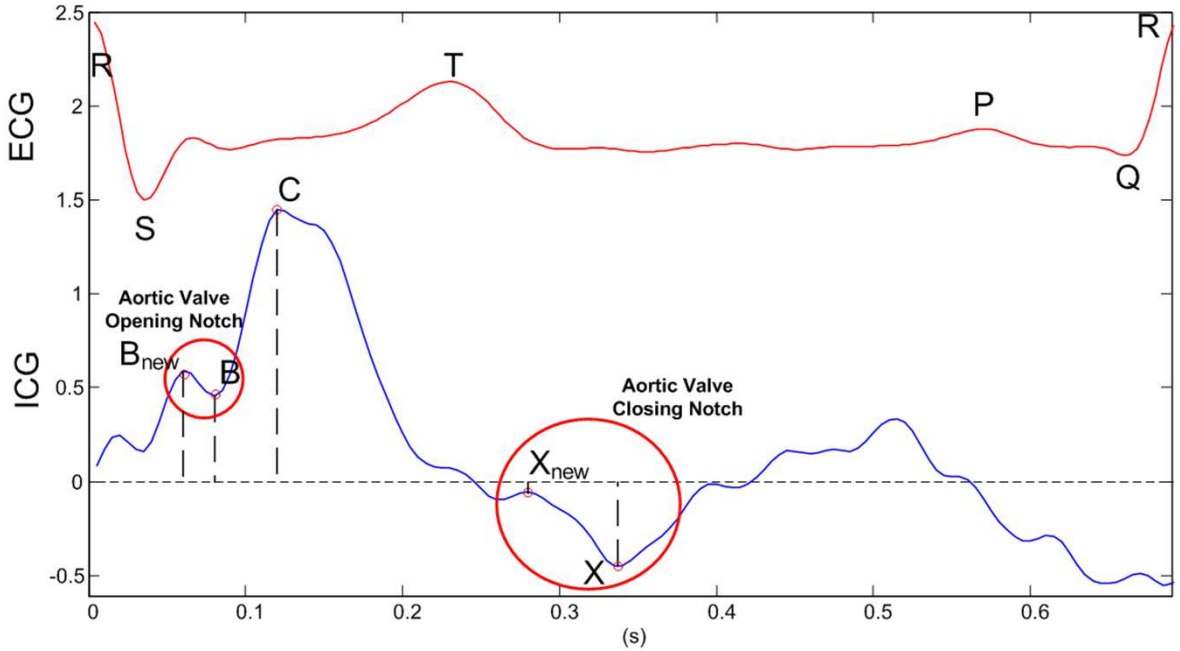


Fig. 1: Definition of characteristic points for aortic valve events in the Impedance Cardiogram.

From Carvalho *et al.*, 2011, "Robust Characteristic Points for ICG: Definition and Comparative Analysis"

Fig. 1: Definition of characteristic points for aortic valve events in the Impedance Cardiogram. Points *B* and *X* are the traditional definitions for opening and closing events of the aortic valve. B_{new} and X_{new} correspond to the proposed definitions. Signal notches related to the opening and closing of the aortic valve are shown in circles.

Writing Style – Visual Elements

- **How?**
  - Use **figures** and **diagrams**
    - To **visually illustrate your methodology**
    - To **illustrate results**
      - E.g., data sets that exhibit trends, patterns, or relationships that are best conveyed visually
  - Use **equations**
    - To **formally and compactly** describe your methods

Writing Style – Visual Elements

- **How?**
  - Use **algorithms**
    - To summarize **step-by-step methodologies** in an objective and integrated way
  - Use **tables**
    - To **summarize results and parameters**
      - Large or complicated data sets, e.g., results for different classes
        - » Difficult to explain using only in text.
    - To **compare results** from different approaches

Writing Style – Visual Elements

Check and double-check equations

Define all terms in equations (as well as figures, tables and algorithms)

Use standard notation and terminology as much as possible

- Easier for the reader to follow.

Permissions and credits

- When copying a figure, **always give credit** to the owner by referencing it
- Sometimes **permissions** are needed

Writing Style – Numbering

- **Chapters and Sections**
  - Goal
    - Give structure to the document
  - How
    - Should be numbered sequentially
      - **Ch#.Sec#.SubSec#**
        - » **2.3. LVET Estimation**

Writing Style – Numbering

Avoid more than **3 numbering levels**

- Causes confusion in the reader
- Indicates bad structuring
- If it is necessary to create more sub-sections, don’t numerate them

Writing Style – Numbering

- **Figures, tables, algorithms, equations**
  - Goal
    - Give a unique identification to the elements you create to support your text
      - Referred to unambiguously
  - How
    - Should be **numbered sequentially**
      - Typically, only **item number**
        - » Sometimes **chapter.item number**
    - Should **always** be **referred to** in the text
      - Every figure, table, equation, etc. must be cited in text

Writing Style – Numbering

- **Figures, tables, algorithms, equations**
  - How
    - **Caption location**: figures, tables, algorithms
      - Depends on the defined format
        - » **Figures**: caption typically **below** the figure
        - » **Tables** and **Algorithms**: typically **above**
        - » **Equations**: to the **right**
    - **Text font**
      - Typically, a different font type and size for captions

Writing Style – Other Tips

English or invisible…

- Publish preferably in English, so that your research is accessible worldwide

Never translate!!

Final version of a paper translated into English

Inspired from [Zucolotto V., 2011]

- Never write first in your native language and then translate!!!
  - **"Nativization" of the target language** (many native expressions, sentence ordering, syntactical norms literally translated into the destination language)
  - **Write directly in the final language**
    - » If necessary, use a native or fluent speaker to review your text

Writing Style – Other Tips

English or invisible…

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~~Final version of a pap nslated into English~~

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    - » If necessary, use a native or fluent speaker to review your text

Writing Style – Other Tips

Improve writing skills

- Nothing works better than **reading a lot**

Acronyms

- **Define** acronyms in their **first use**
  - Write complete expression and put acronyms in parentheses
  - In long texts, it may be wise to **repeat acronym definition** a few times throughout the text → improve memorability

Define any **specialized terms** or **abbreviations**

Writing Style

Further reading

- Main
  - Glasman-Deal H. (2010). “Science Research Writing for Non-Native Speakers of English”, Imperial College Press
  - Peat J., Elliott E., Baur L. and Keena V. (2002). “Scientific Writing, Easy When You Know How”, BMJ Books
  - Day R. (1998). “How to write and publish a scientific paper”, 5th Edition, Cambridge University Press
- Additional
  - Zucolotto V. (2011). “Como Escrever e Publicar bons Artigos Científicos”, Presentation, In English, URL: http://www.escritacientifica.sc.usp.br/wp-content/uploads/MD-Como-Escrever-e-Publicar-bons-Artigos-Cientificos-Prof.-Zucolotto.ppt
  - Gaafar K. (2010). “How to write a scientific paper”, Presentation, URL: http://www.ece.uprm.edu/~domingo/teaching/ciic8996/How%20To%20Write%20A%20Scientific%20Paper_1.ppt

Reviewing your Document

Reviewing your Document

- **Goals**
  - Carefully review your paper before submitting

"Every scientific paper contains serious errors. If your errors are not caught before publication, you'll eventually have to write an erratum to the paper explaining (a) how and why you messed up and (b) that even though your experimental results are now totally different, your conclusions need not be changed" [Schulman, 1996]

Reviewing your Document

- **How?**
  - **Content**
    - Make sure the **methodology has no flaws**
    - Make sure the **results and conclusions are accurate**
    - Make sure the **literature review is meaningful and comprehensive**

Reviewing your Document

- **How?**
  - **Form**
    - Make sure the **text is clear**, **without grammatical or syntactical errors**
      - Simplify text, eliminate redundancies
      - Ask for a native speaker to review it, if necessary
    - **Check every figure, table, equation and algorithm**
    - Make sure you **use the right citations** (especially for numeric citations)

Reviewing your Document

- **How?**
  - Ask for **someone to review** and comment on your paper
    - Someone knowledgeable in the topic
    - Someone "distant" to the topic
  - **Proofread**
    - Section headings, all numbering (sections, equations, tables, figures, etc.), captions, reference list , in-text citations, etc.
    - Text: typos, grammar
    - Search the text for references (bibliography, tables, etc.)

(See **Writing Sequence, Writing Style**)

Reviewing your Document

Do a **break of a few days** before the final revision

- Allows you to look from a distance

Be your worst critic!

- See your paper as the reviewers will see it

Good writing is **iterative**

- Don’t expect to have a perfect manuscript at first attempt

Poor presentation (form and/or content) will **frustrate the reviewers**

- They will get a **negative predisposition** and **won’t read your paper properly**

Submission

- Where to Publish?
- Formatting
- Cover Letter

Submission

- **Goals**
  - **Submit** your paper **on time** to an **adequate journal/publication**
- **How**
  - Select a **proper journal/conference**
  - **Don't count on deadline extensions**
    - Although they happen frequently, some submission sites are strict

Submission – Where to Publish?

- **Goals**
  - Select the **proper** journal/conference to publish your work
- **How?**
  - Find **established journals and conferences on your field**
    - Editorial body **highly regarded** in their fields
    - **Important papers you've read** were published there
  - Check the **editorial line**
    - Does the theme of your work fit the journal/conference topics?

Submission – Where to Publish?

- **How?**
  - **Compare relevance of your work** to the journal/conference
    - Is your work **good enough for a top-class journal**? Is it too good for a lower-class journal?
      - New paradigms, new methodologies with cutting-edge results in very important problems, …
    - What's the **acceptance rate**?
    - Does the journal's **impact factor** follow your expectations?

Submission – Where to Publish?

ANNUAL REVIEWS RANKINGS IN THOMSON REUTERS JOURNAL CITATION REPORTS®

2011 Journal Citation Reports® (Thomson Reuters, 2012)

Annual Review of:	Rank	Category Name	# Journals Cited In Category	Impact Factor	Cited Half-Life
Analytical Chemistry	1	Chemistry, Analytical	73	9.048	3.1
Analytical Chemistry	2	Spectroscopy	41	9.048	3.1
Anthropology	7	Anthropology	79	2.553	>10.0
Astronomy and Astrophysics	1	Astronomy and Astrophysics	56	26.452	>10.0
Biochemistry	1	Biochemistry and Molecular Biology	289	34.317	>10.0
Biomedical Engineering	1	Biomedical Engineering	72	12.214	6.6
Biophysics	1	Biophysics	74	13.574	2.9
Cell and Developmental Biology	1	Developmental Biology	40	15.836	8.0
Cell and Developmental Biology	7	Cell Biology	180	15.836	8.0
Chemical and Biomolecular Engineering**	1	Chemistry, Applied	71	7.294	1.4
Chemical and Biomolecular Engineering**	4	Engineering, Chemical	133	7.294	1.4
Clinical Psychology	1	Psychology, Clinical (Social Science)	109	9.111	4.5
Clinical Psychology	3	Psychology (Science)	75	9.111	4.5
Condensed Matter Physics**	5	Physics, Condensed Matter	69	12.389	1.3
Earth and Planetary Sciences	2	Geosciences, Multidisciplinary	170	7.227	>10.0

From http://www.annualreviews.org/page/about/isi-rankings

Submission – Where to Publish?

- **How?**
  - Check **time until publication**
    - Mean time from submission and notification
      - Prompt and helpful revision? 3 months, 1 year?
    - Mean time from acceptance to publication
      - Is the journal published often enough? Every month, every 3 months?
  - Check **costs**
    - Any submissions charges?
    - Extra page costs?

Submission – Where to Publish?

Dear *Author Name*

Firstly I apologise for the extremely long time that this submission has been in review, far longer than our target and longer than you could rightly expect. We have taken steps to speed up the review process, but we remain at the mercy of reviewers who work as volunteers and do not always complete reviews on schedule.

Submission – Where to Publish?

Select a journal/conference that **you read and/or cite a lot**

- It's very likely that your work fits there

Avoid **scientifically suspicious journals** and conferences

- You want to contribute to science and build a career, not just publish without criteria

Sometimes, it is important to check if the journal/conference is covered by specific **indexing agencies**, e.g., **ISI Web ok Knowledge**

- E.g., if you are evaluated depending on the basis of indexed papers you publish

Submission – Formatting

- **Goals**
  - Format your manuscript according to the guides to authors
- **How**
  - Follow the instructions!

It is annoying to receive badly formatted papers!

Submission – Cover Letter

- **Goals**
  - **Friendly introduce your paper** to the editors
  - Briefly and boldly **state why think your paper deserves to be published** (importance to the development of the field)
- **Why?**
  - Some type of **letter is sometimes required** in some publications
    - Even though many submissions are now online and don't require a letter

Submission – Cover Letter

Dear Editor:

Please find attached the manuscript entitled: **A new strategy to investigate the toxicity of nanomaterials using Langmuir monolayers as membrane models**, which we submit for publication in Nanotoxicology. The reasons why we believe it deserves to be published stem from the following features:
i) To our knowledge, this manuscript is the first report of a strategy to investigate the types of interaction that may occur between a nanomaterial, viz., carbon nanotubes and phospholipid membranes, in a way that experimental parameters can be controlled at the molecular level.
ii) The methodology is reported here for a specific carbon nanotube/dendrimer complex, which had been applied as drug-delivery systems. However, this new methodology may be of interest to a wider audience investigating the toxicity of nanomaterials, either in vitro or in vivo, since the same strategy can be applied to different nanocomplexes, nanoparticles, etc.

Sincerely

Prof. Dr. Valtencir Zucolotto

From [Zucolotto V., 2011]

Submission

Further reading

- Main
  - Day R. (1998). “How to write and publish a scientific paper”, 5th Edition, Cambridge University Press
  - Peat J., Elliott E., Baur L. and Keena V. (2002). “Scientific Writing, Easy When You Know How”, BMJ Books
- Additional
  - Lawrence D. J. (2012a). “Scientific Writing”, Presentation, Course on Scientific Writing, URL: http://w3.palmer.edu/lawrence/Scient_Writ/PPT/Session%201%20CRT.ppt

Post-Review

- Notification
- Resubmission

Post-Review – Notification

- **Goals**
  - To inform the authors about the **decision** resulting from the **paper review** process
    - **Acceptance**
    - **Rejection**
    - **Acceptance subject to changes (minor or major)**
- **How?**
  - External **reviewers send their comments** about the paper
  - **Editor sends the decision** according to the reviews

Post-Review – Notification

- **Notification results**
  - **Acceptance**
    - The paper is accepted as is, without revisions
    - Very rare
  - **Acceptance subject to minor revisions**
    - Minor remarks, typos, etc. identified →small corrections needed
  - **Acceptance subject to major revisions**
    - Major remarks to your methodology, results and discussion, etc.
    - The reviewers believe you can fix the detected problems and are willing to review it again
  - **Rejection**
    - Reviewers don't even want to evaluate an improved version of the paper

Post-Review – Notification

- **Notification results**
  - Conferences
    - Typically only acceptance or rejection
      - Although some allow conditional acceptance and evaluation rebuttal
    - If accepted, you can, nevertheless, **improve your paper** with the reviewers' comments

Post-Review – Notification

Dear *Author Name*

I will be happy to accept this paper for publication after revision to answer the points the reviewers make (see the above attachments). I regard the following points as particularly important:
(…)
I disagree with the reviewer's suggestion that certain formulae be omitted. It is true that they describe well-known signal processing operations, but they will not be well known to all readers of *Journal Name*, and sometimes misunderstandings can arise when different interpretations are taken of such operations. Giving a formula means that there can be no ambiguity.

I look forward to receiving your revised submission, which I ask you to make via the Journal's new Manuscript Central site (http://www...). This will make it easier to send your paper on for production once it has been accepted.

Editor Name

Post-Review – Notification

Dear *Author Name*

Based on the reviewer comments, your submission entitled *"Paper Title"* requires major rewriting possibly subject to a second round of reviews in order to be accepted for publication in *Journal Name*. We hope you find the reviewer comments helpful in improving your submission.

Yours sincerely,

Editor

We regret to inform you that your paper has not been accepted for presentation at the conference. The reviewers' comments on your paper are attached at the end of this email.

Comments from the Reviewers:
---- To this reader, there does not seem to be that much original material here. However, the results seem somewhat convincing.
----- The approach described in the paper seems well motivated and effective and the authors have done a good job relating their work to other published efforts.
----- This would be a good paper for *Conf B*, but it isn't sufficiently technical for *Conf A*

Post-Review – Notification

- **Typical rejection causes**
  - Irrelevant topic
  - Work not sufficiently original
    - E.g., review paper not original, methodology in a research paper not sufficiently original, even though results are good
  - Original methodology, but results not good enough
  - Low acceptance rate
  - Theme doesn't the journal/conference
  - Shallow, uncritical literature review
  - Methodology lacks rigor
  - Poor analysis of results, experimentation, etc.
  - Bad science, in general
  - Bad writing quality and presentation

Post-Review – Notification

"I **reject** somewhere between **25 and 40%** of all papers submitted to *EJIS* **without going to review**. This may seem very high and very high-handed, but there is no point in wasting the valuable time of our Associate Editors (AEs) and reviewers (the Review Team for a paper – all voluntary) on papers that are obviously not going to be accepted". [Paul, 2005]

Post-Review – Notification

Don't feel disappointed/angry/offended if your paper is rejected

- If the reviewers are constructive, they will give **you important hints for improving your paper**, selecting an appropriate publication, etc. → don't give up and **try again** (maybe in another journal)
- The best scientists get rejected

Consider **contesting** the decision only if you have strong arguments that prove the reviewers or editor made a wrong evaluation

Post-Review – Resubmission

- **Typically, only for journals**
- **Addressing the reviewers' comments**
  - **Carefully read the editor's letter**
    - Hints on the most important issues
  - Answer **all the questions** and address **all the recommendations**, either major or minor, e.g.,
    - Missing statistical tests
    - Typos
  - Write the **summary of revisions**
    - Clearly presenting your answers to every single question raised by the reviewers
      - How you fixed the problem or why you disagree with the reviewers in some point

Post-Review – Resubmission

Dear *Editor*,

Please find attached the revised version of my paper. I also send you a brief summary of changes (further details in the attached file):

- The paper was significantly re-structured so as to fulfill the expressed concerns. A few more diagrams were added, pseudo code was included and most of the explanations were clarified.
- The title was changed (as request by reviewer 1).
- System overview is now more complete, with additional explanations on the previous modules of the system
- The 'experimental results' section has changed significantly.

I hope that the present version of the paper is now more relevant to your journal and to this community. I thank you very much for your excellent suggestions, regardless of your final decision.

Best regards,

Author Name

Post-Review – Resubmission

- **Don't take a defensive attitude** towards the reviewers' recommendations
  - If you don't agree with some aspect, present your arguments objectively in the summary of revisions
    - Be clear, constructive and polite

Post-Review

Further reading

- Main
  - Day R. (1998). “How to write and publish a scientific paper”, 5th Edition, Cambridge University Press
  - Peat J., Elliott E., Baur L. and Keena V. (2002). “Scientific Writing, Easy When You Know How”, BMJ Books
- Additional
  - Paul R. J. (2005). “Editor's View: an opportunity for editors of IS journals to relate their experiences and offer advice. The Editorial View of Ray J Paul. First in a series”, European Journal of Information Systems, Vol. 14, pp. 207–212
  - Pierson D. J. (2004). “The top 10 reasons why manuscripts are not accepted for publication”, Respiratory Care, Vol. 49, No. 10, pp. 1246-1252

Paper Dissemination

Paper Dissemination

- **Goals**
  - Make your **research useful** to others
    - Unknown → useless
- **How**
  - **Online or invisible**…
    - Add your paper to your university's paper repository, personal homepage, etc.
      - Beware of copyright issues
  - Disseminate in your **network of contacts**
    - Talks, workshops, meetings, conferences

Conclusions and Future Work

Conclusions and Future Work

- **Conclusions**
  - This document summarized a number of **general guidelines** for **producing good research papers**
    - These guidelines are **general rules of thumb** based on **literature review** on the theme and my **personal experience**

Conclusions and Future Work

- **Reflections**
  - **Conference paper vs Journal paper vs Thesis**
    - **Same basic principles**
    - Difference is the **level of detail** (overly simplistic, but I like that ☺)
      - E.g., a thesis may have an entire chapter/section on background information

A thesis is just a big paper.

Conclusions and Future Work

- **Future Work**
  - **Improvements** to the current document
  - **How to write good scientific research proposals?**
    - Some principles are the same
    - But you are trying to **convince funding institutions** that
      - The **problems** you want to study are **key** for the progress of humanity ☺
      - The **strategies** to address them are the **best**
    - … **without having concrete results to show**
    - → **Other stuff** is necessary
      - Strong social/economic impact, convincing proposed methodologies and work plan, project management strategies, team quality, etc.

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Universidade de Coimbra, Portugal

About the Author

About the Author

- **More info at http://rppaiva.dei.uc.pt/**

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