WRITING SCIENTIFIC ABSTRACTS

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Characteristics of abstracts: Organisation

• Usually 1 paragraph for reports, journal articles and sometimes 2 paragraphs for longer papers such as dissertations and theses.
• They generally follow the order of the work they are condensing
• They should provide a well balanced account of the original study i.e. not focusing disproportionately on 1 or 2 sections of the article
• Should read seamlessly moving smoothly from section to section, rather than mechanically devoting a sentence to each section
• McMurrey describes the process of writing an abstract: ‘.. as if someone had taken a yellow marker and highlighted all the key points in the body of the report into a [1-page] document' [McMurrey, Online Technical Writing], though he points out the need for further editing and revision to ensure readability
Abstracts: Length & Purpose

- Follow guidelines about length: a strict word limit for journals [usually less than 300 words], or page limit of usually 1 page for dissertations and theses. With articles submitted for publication, not complying with the word limit can lead to rejection.

- Abstracts provide a standalone account, rather than an introduction to the paper.
Abstracts & the impact on the reader

Key part of scientific writing, introducing much of the material we read: longer reports, journal articles, abstracting journals, conference presentations, dissertations & theses. The abstract:

- should enable the reader to decide whether to read further
- is the first part to be read, therefore it sets up positive or negative expectations for the remainder of the work
- should create a positive expectation of the study; a well-written abstract encourages readers, who decide the topic is relevant, to read further
- if poorly written, discourages us from reading further or results in us reading grudgingly.
- should be pitched at the range of readers who will read both it and possibly the complete paper.

When submitting a dissertation, or a paper for publication, the quality of our abstract is a key factor in determining the reader's response.
Writing Abstracts: Language And Style

• written in a formal, impersonal scientific style. However 'we' is commonly used. Passive or active constructions can be used [passive e.g. Measurements were made.. Object, to be + past participle]

• should use a level of language that will be understood by those for whom the report is intended.

• often packed with a considerable amount of information but should not overload the reader.

• should be succinct, avoiding redundancy.

• written in complete sentences with effective punctuation.
How To Check and Revise an Abstract

Ask a critical friend to read it. Can they explain to you the scope and structure of your abstract?

• Does it flow and establish a clear connection between ideas?
• Can you cut any superfluous information?
• Have you written it succinctly? Is it free from wordiness?
• Is it a well-balanced representation of the original paper? Has any key information been omitted?
• Is it appropriately paragraphed?*
• Have you checked that it does not contain cross references to graphical or other information in the report?
• Is it free from errors: grammatical, non-scientific style, sentence structure and punctuation?
• Have you kept to the word limit?
• Have you made sure that it does not include information, ideas or claims that are not included in your paper?
Writing Abstracts & Titles: Guidelines from Journal of Ecology

Journal of Ecology: Title page. This should contain:

A concise and informative title (as short as possible). Do not include the authorities for taxonomic names in the title. Summary (called the Abstract on the web submission site). This should list the main results and conclusions, using simple, factual, numbered statements. It must not exceed 350 words. The last point in the Summary should describe how the findings add to our general ecological understanding. This policy is intended to maximize the impact of your paper, by making it of as wide interest as possible. This point should therefore explain the importance of your paper in a way that is accessible to non-specialists.

Plant, Cell and Environment: Abstract- This should provide a concise statement of the scope of the work and the principal findings. The abstract should be less than 200 words http://www.blackwellpublishing.com/submit.asp?ref=0022-0477
Analyzing abstracts (1)

Slides 10 to 14 contain sample abstracts. Try coding the sentences in Abstract 2 & one other according to their function:

- **B** = background information
- **P** = principal activity/purpose/scope/aims of study
- **M** = information about methodology
- **R** = main results
- **C** = main implications/conclusions of the work
- **RC** = Recommendations

Adapted from Weissburg and Buker (1994)
Analysing abstracts (2)

Now look at 2 or 3 abstracts closest to your field.

- Are they successful as stand alone summaries?
- Are they well structured and flow well?
- Would they encourage you to read further?
- Would you judge the writer as a competent researcher?

Slide 15 provides a brief analysis of the abstracts.
Evaluating abstracts: Abstract 1-Environmental Science about the estimation of natural recharge

Natural ground water recharge is estimated using the injected tracer technique in the Bairasagara watershed of Kolar district, Karnataka (India) comprising of medium grained granite and granatic gneiss with weathering/fracturing up to 46 m depth. On a macroscopic scale, it is estimated that the weathered granites act as a uniform body having a recharge capacity of about six to 200 mm per annum for an average value of rainfall of 968 mm. Marked differences of infiltration rates (nil to 130 cm/year) were observed under cultivated and dry areas. The water level fluctuation and recharge are found to be minimum in the ayacut area as compared to the catchment area. Studies helped in demarcating recharge and discharge areas. Qualitative correlation studies of estimated natural ground water recharge have been carried out with depth to basement, resistivity of subsurface layers, and water level fluctuations.

An attempt has been made to get empirical relationships between the recharge versus depth to basement, and recharge versus water level fluctuations. This paper discusses the studies carried out, the results obtained the importance of such studies in the evaluation of groundwater resources.
Evaluating abstracts: Abstract 2- Biology

Stimulus-induced oscillations in plant cell cytosolic free calcium. Ca^{2+} is implicated as a second messenger in the response of stomata to a range of stimuli. However, the mechanism by which stimulus-induced increases in guard cell cytosolic free Ca^{2+} ([Ca^{2+}]) are transduced into different physiological responses remains to be explained. Oscillations in [Ca^{2+}] may provide one way in which this can occur. We used photometric and imaging techniques to examine this hypothesis in guard cells of *Commelina communis*. External Ca^{2+} ([Ca^{2+}]_e), which causes an increase in [Ca^{2+}], was used as a closing stimulus. The total increase in [Ca^{2+}] was directly related to the concentration of [Ca^{2+}]_e, both of which correlated closely with the degree of stomatal closure. Increases were oscillatory in nature, with the pattern of the oscillations being dependent on the concentration of [Ca^{2+}]_e. At 0.1 mM, [Ca^{2+}]_e induced symmetrical oscillations. In contrast, 1.0 mM [Ca^{2+}]_e induced asymmetric oscillations. Oscillations were stimulus-dependent and modulated by changing [Ca^{2+}]_e. Experiments using Ca^{2+} channel blockers and Mn^{2+}-quenching studies suggested a role for Ca^{2+} influx during the oscillatory behavior without excluding the possible involvement of Ca^{2+} release from intracellular stores. These data suggest a mechanism for encoding the information required to distinguish between a number of different Ca^{2+}-mobilizing stimuli in guard cells, using stimulus-specific patterns of oscillations in [Ca^{2+}].
Evaluating abstracts: Abstract 3 - Statistics

Non-parametric ecological regression and spatial variation

Ecological studies aim to analyse the variation of disease risk in relation to exposure variables that are measured at an area unit level. In practice it is rarely possible to use the exposure variables themselves, either because the corresponding data are not available or because the causes of the disease are not fully understood. It is therefore quite common to use crude proxies of the real exposure to the disease in question. These proxies are rarely able to explain the disease variation and hence additional area level random effects are introduced to account for the residual variation. In this paper we investigate the possibility to model the effect of ecological covariates non-parametrically, with and without additional random effects for the residual spatial variation. We illustrate the issues arising through analyses of simulated and real data on larynx cancer mortality in Germany, during the years of 1986 to 1990, where we use the corresponding lung cancer rates as a proxy for smoking consumption.
Geomorphology and pollution: the environmental impacts of lead mining, Leadhills, Scotland  The Glengonnar Water has experienced severe environmental pollution resulting from historic lead mining operations. Though now abandoned, the legacy of the mining era remains in the form of river and floodplain sediments grossly polluted with metals, particularly lead which exhibits surface concentrations in excess of 75,000 mg kg total Pb. Geomorphological investigations link the most important mining period to a major phase of floodplain degradation, which acted as an efficient sink for particulate bound metals. The pattern of metal contamination within the floodplain has been complicated by subsequent fluvial entrenchment. However, preliminary evidence indicates that lateral and vertical variations of metals [both total and available] can be accounted for in terms of the age of deposit, distance downstream and local hydraulic conditions. The effectiveness of floodplains to interrupt the delivery of sediment-bound contaminants was highlighted by a metals budget developed for the main channel length. This confirmed that channel bank erosion of contaminated floodplains is now the major source of metals to the fluvial system.
High frequency digital power line transmission for terrestrial and marine networks

The aim of this work was to investigate a feasibility study based on an appropriate method of propagation results, analysing suitability of communication through power line transmission channels. With this as the main aim the emphasis of the work has been placed on: initially the design of simulators resulted from the modelling of the channel, followed by low complexity protocols and modulation schemes, and the real time performance evaluation of point to point multimedia kit designed and tested for application on a QinetiQ project.

This thesis describes the work carried out in the areas of propagation, modulation design, duplex protocol, modelling and simulation and real time channel evaluation. Also presented herein is the design and implementation of conditioning units “Coupling Devices” together with implementation of remote/local control mechanism to aid the project requirement” remote control of the vessel via power line.

The effectiveness of these devices, and various measurements and real time trials of the simulators, and the multimedia kit, is the prime importance throughout this thesis. Simulation results, while assessing the effectiveness of an OFDM COSSAP model, mainly are tried over an AWGN channel, and later on over a Rayleigh fading channel and subsequently over AWCN, with appropriate for power line channel, are used to illustrate and support this work. The most important results are the successful outcome of the multimedia multiplexed kit trials on board RV TRITON a QinetiQ vessel, and similarly at the power line laboratory, where real time text, audio and video, as well as duplex conferencing were demonstrated with modems connecting at 33.6 kbits/s.

Finally, investigation of the three-phase 440V power line channel resulted in lodging a patent that uses the STD/STC techniques. These techniques, whilst in their field are not new, however with the diversity gain achieved when using smart power line modem design will enhance data throughputs in multiples of the presently achievable rate.
Analysis of the 5 abstracts

1. Poor organisation of information; no clear pattern for organising the stages of research; 2 paragraphs unnecessary in journal abstracts

2. Highly succinct; very well organised with clear signalling of information; main topic of sentence usually at beginning of sentence; passive used

3. Abstracts in Statistics seem to follow a different pattern of much longer background information sections [3 sentences; sentence 4: topic/aim; sentence 5: analysis conducted in the paper]

4. Well written, flows well with good relationship between ideas across sentences; though stronger on background than findings

5. Was a 1st draft of a PhD abstract; as a result it’s not succinct; main message & IMRaD structure unclear; tenses need revising
References


McMurrey, D. *Online technical writing*. Available at http://www.prismnet.com/~hcexres/textbook/