



# Specific learning goals for Write a Scientific Paper (WASP) courses

## Contents

<b>Specific learning goals for Write a Scientific Paper (WASP) courses .....</b>	<b>1</b>
Introduction .....	2
Downloads.....	3
Website .....	3
Generic talks.....	3
Introduction .....	3
What can I publish? .....	3
Journals, Editors and Colleagues .....	3
How to write a proposal .....	3
Which journal to target and why? .....	4
Critical appraisal of existing research - 1 .....	4
Critical appraisal of existing research - 2 .....	4
Plagiarism and the ethics of dealing with colleagues .....	4
Editors’ perspective of submissions and dealing with editors .....	4
Open Access, predatory journals and fake invitations.....	4
Practicalities .....	5
Structuring a scientific paper.....	5
How to prepare a thesis .....	5
Presenting a scientific paper .....	5
Writing for the media .....	5
Surveys .....	5
Preparing an abstract .....	5
Preparing a poster .....	6
Online research tools & bibliographic software .....	6
Refworks.....	6
Dual axis coronary angiography – paper example.....	6
Interfacing with the laboratory (WASP in Malta only).....	6
Grant availability and application (WASP in Malta only) .....	6
Statistics .....	6
Stats 01: Data entry, graphs .....	6

Stats 2: Introduction to statistical analysis .....	6
Stats 3: T-tests, Z-test & ANOVA.....	6
Stats 4: Contingency Tables.....	7
Stats 5: Odds ratio & relative risk.....	7
Stats 6: Correlation & regression.....	7
Stats 07: Meta-analysis.....	7
Stats 08: Sample size estimation, survival analysis, number needed to treat .....	7
Creating a custom spreadsheet .....	7
Statistics Session using delegates' own laptops .....	7
Ethics, data protection, recruitment and consent.....	7
Data protection .....	7
Ethics approval for a research study .....	8
Recruitment and informed consent .....	8
Conclusion to WASP - <i>Kleos Aphthiton</i> .....	8
Feedback .....	8
Publication concerning WASP .....	8
Upcoming WASP events and registration.....	8

**Document prepared by Prof. Victor Grech 05/17**

**Introduction**

WASP courses are three day intensive events with formal lectures and interactive sessions. WASP was created, and is run by Prof. Victor Grech along with other Maltese academics. Write a Scientific Paper is an international and unique course that has been successfully held in Malta in 2010, 2011, 2012, 2013, 2016 and 2017, and in London in 2017. It will be held again in both Malta and London in October 2017.

Each iteration has led to fine tuning of the contents via feedback from successive attendees. The course deals not only with the writing skills and standards expected of rigorous and exacting academic work, but also with the epistemological and methodological underpinnings of this style of writing.

The statistics aspects are demonstrated by practical examples using real, published data within Excel an environment with which all researchers are familiar. Attendees will be expected to have Excel installed on their own laptops and will be given Excel add-ins that carry out tasks that Excel does not natively perform. Attendees will be expected to have used Excel and to have a good working knowledge of the software's basic functions up to ECDL (European Computer Driving Licence), the computer literacy certification programme standard.

The purpose of WASP is to impart the highly experienced lecturers' collective experience to the delegates in this crucial aspect of career progress.

All WASP events apply for 18 internationally valid EACCME points.

WASP in London 2017 was also endorsed by the Royal College of Paediatrics and Child Health.



## Downloads

Throughout the three days of the course, delegates are asked to periodically download soft copies of the talks as well as the papers that were used for the purposes of illustration. Downloads also include the actual datasets demonstrated as well as all spreadsheets that are demonstrated, which extend Excel's™ native capabilities. Prof. Grech is well suited to imparting the statistics lectures, having co-written the statistics chapter in *The Science of Paediatrics: MRCPCCH Mastercourse* (Lissauer). The papers discussed as examples during the course and handed out as PDFs and datasets are all work also carried out by Prof. Grech.

## Website

**Website:** <http://www.ithams.com/wasp>

## Generic talks

### Introduction

Understanding: why write? Understand research motivations, broadly and personally: the dissemination of one's own work and improvement of career prospects. The p for networking with like researchers and the quest for self-improvement.

### What can I publish?

***A very broad overview – all to be dealt with in detail in different talks.***

Comprehend level and prestige of publication: case report to RCT to meta-analysis and systematic review. Understand how to get started and possibilities of recruiting help/co-authors. Find out which journals to target: local/international, general to subspeciality, indexed/unindexed journals. Understand the relevance of impact factors.

Appreciate the skills needed and the logical stages: find a topic, background reading, proposal, data collection, analysis, writing, submission and resubmission.

Understand the tripod of forces: authors want to publish/readers are inundated/editors just want to enhance impact factors.

Understand which case reports to bother with. Other types of audits and studies. With copious examples.

The importance of grasping serendipity and happy coincidences. Understanding deliberate media involvement by journals. Examples of unusual topics that speaker has published on.

## Journals, Editors and Colleagues

### How to write a proposal

Understanding the importance of coming up with an original research question, performing a literature review, formulating a hypothesis and creating (in effect) an introduction and methods section for an eventual paper. Comprehending the need for novelty, creativity and feasibility as well as a reader friendly document. The importance of demonstrating preparedness for eventualities: GANTT charts, feasibility of study and contingency plans.

### Which journal to target and why?

Invited vs submitted papers. General interest or specialised journals. Subscription or open access, print or electronic only, indexed or unindexed. Using keywords to narrow down a choice.

Understand different journals have different publication frequencies, turnaround times, publication delays, fees, selective open access policy.

Understand predatory journals and the warning signs. Beall's List, vanity press.

Understand traditional copyright vs Creative Commons License.

Useful tools and indices to locate suitable journals such as PubMed, Web of Science etc.

### Critical appraisal of existing research - 1

Understand how to systematically identify strengths and weaknesses of extant research.

Understanding the risks of not being aware of research results, misunderstanding evidence and applying the results of large studies to individual patients.

Understanding research relevance, novelty, study design appropriateness, ethics and data protection, protocols, bias avoidance measures, protocol adherence, hypothesis driven research, correct application of statistical methods, appropriate conclusions, conflicts of interest. Appreciating Critical Appraisal Skills Programme - CASP

### Critical appraisal of existing research - 2

Understanding evidence based practice, association and causation. Strengths of associations and dose-response. Consistency and repeatability, biologic plausibility, specificity of effects, causal associations and chance, bias, confounders,

### Plagiarism and the ethics of dealing with colleagues

Understanding the various types of plagiarism: degrees, forms. Plagiarism is scientific misconduct and its consequences. Comprehending authorship and acknowledgments.

Understanding: honesty, objectivity, integrity, carefulness, openness, respect for intellectual property, confidentiality, responsible publication.

Understanding: responsible mentoring, respect for colleagues, social responsibility, non-discrimination, competence, legality, animal care, human subject protection.

Understanding duty to publish and non-interference by funding bodies.

### Editors' perspective of submissions and dealing with editors

Codes of ethics for authors and editors and publishers. Grasping the duties of editors and their motivations. Understanding the importance of assuaging editors' wants: clarity, brevity, logical outlines, adherence to journal instructions.

Editorial viewpoint: important topic/research area, originality, likelihood of stimulating healthy discussion, controversiality, potential media interest.

Editorial algorithms, the blind peer review, interpreting reviewer reports. Confidential reviewer notes to editors. Accepting inevitable rejections, building on reviewer comments and resubmission. Formatting resubmission letters on acceptance.

### Open Access, predatory journals and fake invitations

Understand the concept of predation in the modern open-access milieu and how to recognise this. Comprehend the various types of open access and their applicability. Appreciate article processing fees.

## Practicalities

### Structuring a scientific paper

Understanding that different types of papers/chapters/books require different approaches and formats. Comprehending the steps: ideation, preparation, drafting, revising and rerevising before submission. Understanding the key article components: summary of the state of the art, identification of knowledge gap, specification of novelty/objectives/scope of the present research work, applied research methodology, results and conclusions. The military strike approach to a paper: set out objectives, obtain and discuss results, conclude. Understand the universal IMRAD format. Understand specifications, competencies and hermeticities of title, key words (MeSH), unstructured/structured (also IMRAD) abstracts, introduction, materials/methods, results. Tips as to how to best format tables and graphs. Closing the loop with discussion, acknowledgments and references.

### How to prepare a thesis

Understanding different types of dissertations, styles, format (IMRAD plus declaration of authenticity, dedication, table of contents, broader literature review and appendices). Understanding how each of the sections is somewhat different from a conventional paper and why. Appreciating how they are assessed according to level pitched (graduate/master's level or doctorate).

### Presenting a scientific paper

Analyze your constraints: audience, occasion and purpose of talk. Tailoring content, structure and form to audiences. The cruciality of knowing the subject, enthusiasm for the subject along with acute awareness of audience. Understanding the application of the IMRAD format to a presentation. Understanding that a slide show enhances a presentation but is not the presentation. Different types of delivery: speech memorisation, reading from a text, winging it and speaking around slides. The psychology of slide shows. Understanding constraints imposed by time and audiences, slide rates and content density.

### Writing for the media

Understanding the importance of using lay language and how the media widely disseminate information, and how to attempt to emphasise accurate conveyance of key messages. Comprehend the steps: define the message, writing it simply and unambiguously before sending. Understanding the media hierarchy: present the main point immediately and work down to required level of detail. The difference between academic writing and writing for the media. Identify medium to be used: article, letter to editor or news feature (press release). Consider enhancements such as photos and graphics. Appreciating the need for accuracy, efficiency, precision, clarity and modesty – no false claims. The importance of avoiding jargon, clichés, and bureaucratise. The importance of being prepared to follow-up if necessary.

### Surveys

How to construct surveys and the utility of Google Forms which are also used for WASP feedback from delegates.

### Preparing an abstract

Understand the need for economy, brevity, clarity, simplicity, parsimony and honesty. Understand that for most editors, some reviewers and many readers, only the title and abstract exist and that this sets the tone for the paper. Understand how to write an abstract and why it should be so.

## Preparing a poster

Understand that this is not a publication on a board. Appreciate the role of posters in conferences, and how to make a poster readable, effective, interesting and stand out with good science and good design. Understand practical font tips and common mistakes.

## Online research tools & bibliographic software

Understand the importance of a proper literature review and how to do it and where to look in various databases; including Boolean operators in searches. Appreciate the wide range of bibliographic software tools and how they can be used to facilitate citation collection and use such citations for software driven in-text citations and automatic generation of bibliographies.

## Refworks

Understand how software in the previous lectures works by practical example through the use of Refworks software.

## Dual axis coronary angiography – paper example

Understanding the step by step construction of a paper by a specific example of an RCT comparing conventional coronary angiography with automated and motorised dual axis coronary angiography.

## Interfacing with the laboratory (WASP in Malta only)

Understand lab databases: historical data collected from tests carried out as required by physicians and pure research data. This lecture explains how to approach the lab and how to prepare for such a meeting, as well as a reminder that funding may be required.

## Grant availability and application (WASP in Malta only)

Understand which sources researchers may be able to tap for funding in Malta or overseas, e.g. at EU level.

## Statistics

### Stats 01: Data entry, graphs

Enabling Excel Analysis Toolpak and adjusting macro security levels. Definitions of terms.

Understanding Excel forms, data entry, garbage in and out, data validation tools, collaborating online, formulas, descriptive statistics. The importance of pivot tables to summarise and group complex datasets, of charting said datasets.

### Stats 2: Introduction to statistical analysis

Understand the need for descriptive statistics for comprehending your data, analysing it and publicising your work as presentations/posters and publications. Types and categories of data. The different ways of describing data: manually and Excel derived (both static and dynamic): variance, standard deviation, standard error, confidence interval – the 68–95–99.7 rule. Commonly used symbols. Kurtosis and skewness. Different shapes of data distribution. Comprehending the utility of the t distribution. How to derive quartiles and IQR manually and using Excel. Boxplot and whisker charts and their correspondence with distribution curves. The notion of  $1.5 \times \text{IQR}$  as outliers. Sampling, bias and types of error.

### Stats 3: T-tests, Z-test & ANOVA

Understand the Central Limit Theorem. Comprehend the null hypothesis, the 5% significance level and the equivalent in other fields of study. Comparison of different means with t tests using Excel. The three common types of t-tests (paired and unpaired, assuming equal and unequal variance, and the relevance of the f test). T test applications, how to perform them with Excel's Analysis Toolpak

and how to set up t tests dynamically with Excel's functions. Understand ANOVA when comparing more than one mean and how to carry it out in Excel. Post-hoc tests.

#### Stats 4: Contingency Tables

Defining contingency tables and their non-parametricity How to carry out chi tests in Excel with Yates continuity correction. Stratification and Mantel-Haenszel test, chi for trend, McNemar's test for paired observations and Fischer's exact test.

Understand the definitions of these terms and how to set up an Excel sheet to calculate them: sensitivity, specificity, positive and predicted value, accuracy and prevalence. Understand the point of ROC (receiver operating characteristic) curves.

#### Stats 5: Odds ratio & relative risk

Understand measures of association, the difference between these two and how to set up manually and dynamically in a spreadsheet. Comprehend that proportions also have confidence intervals and how to calculate them with Excel. Understand the concept of non-parametric tests and when to use them, and identify which test is used instead of its parametric equivalent.

#### Stats 6: Correlation & regression

Understand the similarities and differences between these two, and recognise the need for different correlation tests (Pearson, Kendall, Spearman and Gamma). Understand the linear regression equation, and its limited predictive value. Comprehend its setup in Excel statically and dynamically. Understand when multivariate analysis is needed, including the various types of analysis techniques. Understand the difference between linear and logistic regression. Appreciate the concepts of Poisson probability experiments, distributions and regression.

#### Stats 07: Meta-analysis

Understand hierarchy of evidence and role of meta-analysis with PICO criteria using the Cochrane library and Medline. Appreciate forest plots.

#### Stats 08: Sample size estimation, survival analysis, number needed to treat

Understand Type I and Type II error, base level and effect size. Comprehend the crucial need for and how to perform sample size estimation, factoring in response rates where needed.

Understand survival analysis, Cox proportional hazards model, Kaplan-Meier log-rank tests.

Understand NNT, Control Event Rate, Experimental Event Rate and Absolute Risk Reduction.

#### Creating a custom spreadsheet

Understanding how to construct a complex sheet for dynamic calculations with large datasets, potentially at population levels.

#### Statistics Session using delegates' own laptops

A half-day session wherein all of the datasets manipulated and statistics carried out during the course are redone on-screen. Delegates are expected to demonstrate reproducibility, and to be able to perform the tests and obtain the same results as those demonstrated, live.

#### Ethics, data protection, recruitment and consent

##### Data protection

Understand the importance of showing respect to human rights, and ensuring privacy and confidentiality, with professional secrecy and data security and the actual relevant legislation. The application is similar/identical to Health Ethics as below.

## Ethics approval for a research study

Understand ethics and its importance via historical examples and the legislation that enforces this. Comprehend the Principles of Good Clinical Practice (GCP). Appreciate REC applications and their requirements and documentation.

## Recruitment and informed consent

Understand the importance of voluntary and willing participation of subjects of anonymity, confidentiality, information sheets and consent forms, and the inappropriateness of excessive payments. Understand the relevance of duty of candour. Understand the legislation pertaining to researchers' obligations. Appreciate the additional problems associated with dealing with children and vulnerable adults.

## Conclusion to WASP - *Kleos Aphthiton*

Eternal fame/renown/glory, with publishing as a form of immortality. The exercise of vital powers, along lines of excellence, in a life affording them scope.

## Feedback

Delegates are politely requested to provide anonymous feedback via Google Forms. This deals with each individual talk, with each speaker and with the venue facilities.

## Publication concerning WASP

The circumstances and organisation of WASP have been documented in:

Grech V. WASP – Write a Scientific Paper course: Why and how. *Journal of Visual Communication in Medicine* – in press.

## Abstract

The ability to write up one's research in the form of a paper is a crucial requisite for academics. The skills required are manifold and are acquired piecemeal during one's any individual's training. Matters would be facilitated by a short and intensive course that would cover all of these facets. Such a course would ideally be delivered by experienced writers and editors. It is for this very reason that WASP (Write a Scientific Paper) was created. WASP was held outside of Malta for the first time, in London. This paper describes the preparations required in order to plan and execute a course of this or similar nature.

## Upcoming WASP events and registration



2-4 October 2017

Malta Life Sciences Park  
San Gwann, Malta

Early bird registration: €390

Registration after 15th Sep 2017: €430



23-25 October 2017

Royal College of Paediatrics & Child Health,  
London

Early bird registration: £410

Registration after 15th Sep 2017: £460

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