Scientific writing

Lecture 4:
The original manuscript cont'd
Submission and review processes

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New Syllabus

1. Introduction; principles of effective writing

2. How to read literatures; pre-writing steps

3. The format of an original manuscript (Tables and Figures, Results)

4 (Dec. 18th) The format of an original manuscript (Methods, Introduction, Discussion, Abstract); Submission and Review processes

----------NO CLASS ON DEC. 25th----------

5 (Jan. 8th) How to present your research (attending conference); Other scientific writing (Literature review, CV/resume, application essay, first letter)

6 (Jan. 15th) Revision, Issues in scientific writing (plagiarism, authorship, reference, etc…)

7-8 (Jan. 17th) Student presentation (in English; 5 - 8 min each)

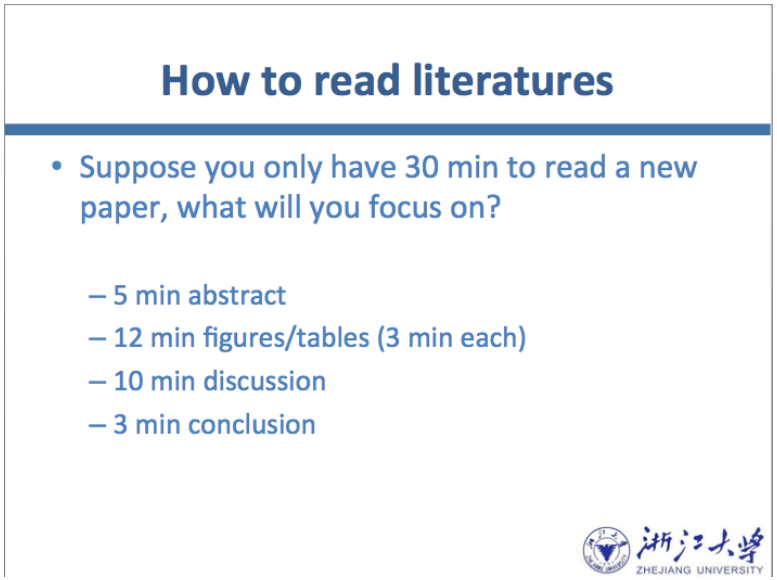
Grading

- Five homework IN ENGLISH: each 15%
  - Total 75%
  - Late homework within 2 weeks accounts for 80%
  - Late homework after 2 weeks accounts for 60%
  - Revise homework +20%
- Final presentation IN ENGLISH: 25%
  - Peer review: 20%
  - Teacher score: 80%

1. Literature reading
2. Outlines
3. Figures
4. Introductions
5. Revise and review

Recommended order for writing an original manuscript

0. Tables and Figures
1. Results
2. Methods
3. Introduction
4. Discussion
5. Conclusion
6. Abstract



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Methods

- Give a clear overview of what was done
- Give enough information to replicate the study (like a recipe!)
- Be complete, but make life easy for your reader!
  - Break into smaller sections with subheadings
  - Cite a reference for commonly used methods
  - Display in a flow diagram or table where possible
- You *may* use jargon and the passive voice more liberally in the methods section

Who, what, when, where, how, and why…

Table 1.

Who, what, when, where, how, and why questions to consider when writing the Methods section.

Who
Who maintained the records? Who reviewed the data? Who collected the specimens? Who enrolled the study participants? Who supplied the reagents? Who made the primary diagnosis? Who did the statistical analyses? Who reviewed the protocol for ethics approval? Who provided the funding?
What
What reagents, methods, and instruments were used? What type of study was it? What were the inclusion and exclusion criteria for enrolling study participants? What protocol was followed? What treatments were given? What endpoints were measured? What data transformation was performed? What statistical software package was used? What was the cutoff for statistical significance? What control studies were performed? What validation experiments were performed?
When
When were specimens collected? When were the analyses performed? When was the study initiated? When was the study terminated? When were the diagnoses made?
Where
Where were the records kept? Where were the specimens analyzed? Where were the study participants enrolled? Where was the study performed?
How
How were samples collected, processed, and stored? How many replicates were performed? How was the data reported? How were the study participants selected? How were patients recruited? How was the sample size determined? How were study participants assigned to groups? How was response measured? How were endpoints measured? How were control and disease groups defined?
Why
Why was a species chosen (mice vs rats)? Why was a selected analytical method chosen? Why was a selected experiment performed? Why were experiments done in a certain order?

from: Annesley TM. Who, what, when, where, how, and why: The ingredients in the recipe for a successful methods section. *Clinical Chemistry*. June 2010 vol. 56 no. 6, 897-901.

Methods

- Materials
  - Drugs, buffers, chemicals, gases, etc…
- Data
  - Where do you obtain your data (e.g., government, institution, online source, etc…)
- Participants/subjects
  - Animals / Humans (state that the research was approved by the appropriate committee at your institution)
- Experimental protocol/study design
- Measurements
  - How were the dependent and independent variables measured Instruments (telescope, microscope, weighing scale, questionnaire, etc.)
  - Where do you make measurements?

Make life easy for your reader!

1. Break into sub-sections with informative subheadings

METHODS
Data description
QuickSCAT measurements of Wind stress
AMSR-E measurements of sea surface temperature

METHODS
Field program
Site Description and Data Collection
Field Method

METHODS
Model description
Experimental setup
2-D online smoothing
Experiment details
Data sets

METHODS
Model background
Equations and discretizations
Configuration and forcing

METHODS
Experimental facility
Concentration measurements
Particle imaging velocimetry

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Make life easy for your reader!

2. Cite a reference for commonly used methods or previously used methods rather than explaining all the details...

Cite commonly/previously used methods

To examine the more highly developed region of the arrested wedge flow, experiments were conducted in a modified version of the facility described in detail in Pawlak & Armi (1998).

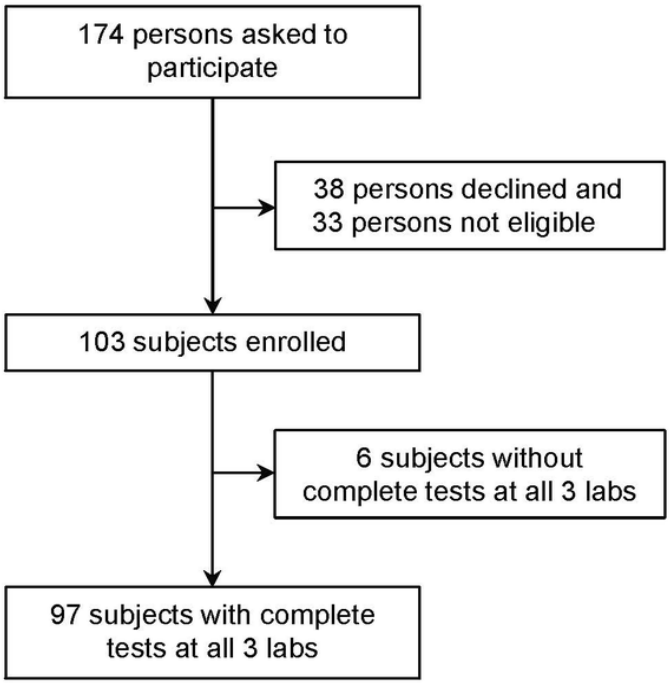
The details of the initial condition can be found in Cantero et al. (2006). The use of a rectangular grid to solve a cylindrical problem may seem odd. However, a rectangular grid provides a uniform resolution away from the centre of the domain, thus capturing better the fine structures of the flow at the front (lobes and clefts). The governing equations are solved using a de-aliased pseudospectral code whose details can be found in Cantero et al. (2007).

In a first stage, mesoscale eddies were detected on each SLA map using the algorithm initially developed by Chaigneau et al. [2008] and slightly modified by Chaigneau et al. [2009]. This algorithm detects eddy centers corresponding to local SLA extrema (minima for CEs and maxima for AEs).

Make life easy for your reader!

3. Use flow diagrams or tables to help simplify explanations of methods!

Figure 1. Study participation diagram.



Whitworth WC, Hamilton LR, Goodwin DJ, Barrera C, et al. (2012) Within-Subject Interlaboratory Variability of QuantiFERON-TB Gold In-Tube Tests. PLoS ONE 7(9): e43790.

Experimental setup

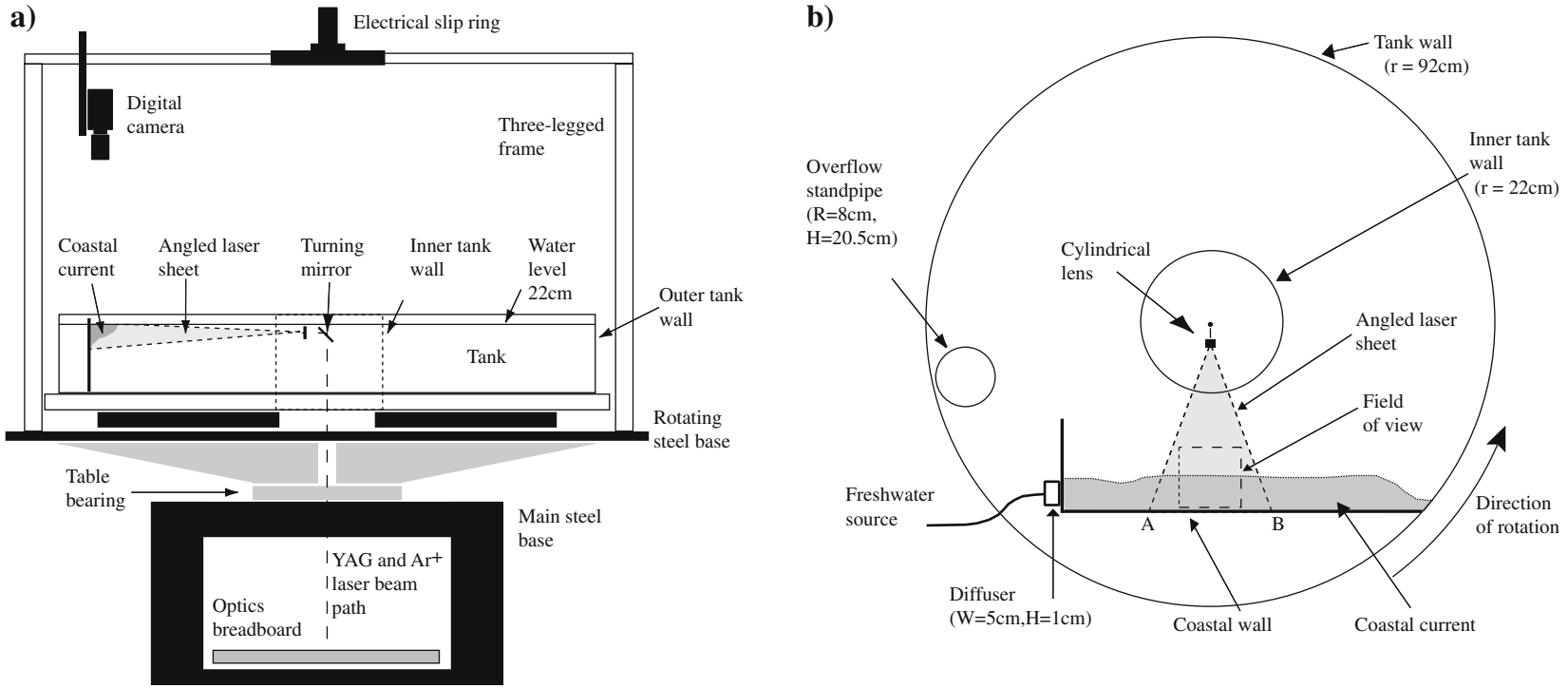


Fig. 1 Schematic of the rotating table viewed from the side **a**, and of the tank configuration viewed from above **b**. The orientation of the angled laser sheet is included in both schematics. In **b** the side of the sheet labeled B extends above the water surface and A extends below the buoyant current

Horner-Devine, 2006 EIF

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Verb tense

- Report methods in past tense
  - "we measured"

- But use present tense to describe how data are presented in the paper
  - "data are summarized as means ± SD"

It's OK to use passive voice (or even to use a combination)!

- **Passive:**

  e. g., temperatures were measured.

  Emphasizes the method or variable.

- **Active:**

  e. g., We measured temperatures

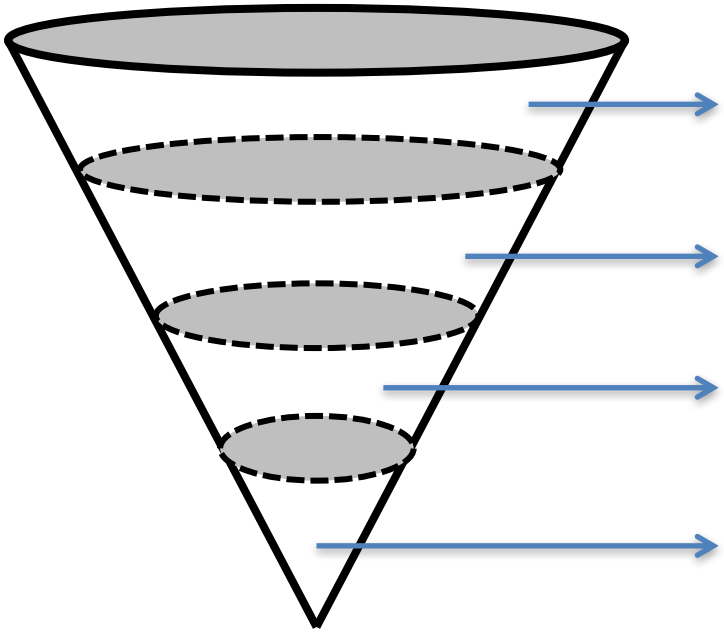
  More lively, but sacrifices having the material/method/variable as the subject of the sentence

  Requires creativity to avoid starting every sentence with We!

Introduction

- Good News: The introduction is easier to write than you may realize!
- Follows a fairly standard format
- Typically 3-5 paragraphs long
- It is **not** an exhaustive review of your general topic
  - should focus on the specific hypothesis/aim of your study
  - Write with your discussion section!

Introduction



Background, known information

Knowledge gap, unknown information

Hypothesis, question, purpose statement

Approach, plan of attack, proposed solution

from: Annesley TM. "It was a cold and rainy night." Set the scene with a good introduction. *Clinical Chemistry*. May 2010 56: 708-713. (Figure 1)

River plumes as a source of large-amplitude internal waves in the coastal ocean

Jonathan D. Nash[1] & James N. Moum[1]

Known information 1

It is generally assumed that internal waves radiate from locations where tidal currents flow over topographic features such as shelf-breaks[10], banks[11] and sills[12,13]. In the last case, waves formed downstream of a sill are trapped to the topography when their wavespeed c equals that of the opposing tidal flow u. They are released and propagate upstream as free waves when u slackens below c (refs 8, 9, 15). The Froude number $F = u/c \leq 1$ sets the criterion for free wave propagation.

In the atmosphere, gravity currents[16] are well-known to excite large-amplitude waves. Perhaps the most famous is the 'Morning Glory', a series of ~500-m amplitude undulations over the Gulf of Carpenteria off northern Australia[17,18]. Wave generation from gravity currents has also been observed in thunderstorm outflows[19] and mountain slope drainage winds[20]. However, the large scales of

Unknown information 1

mountain slope drainage winds[20]. However, the large scales of atmospheric flows make it difficult to obtain the detailed measurements necessary to show the process by which freely propagating waves emerge from a gravity current. Although laboratory experiments[21,22] have helped to show this evolution, these experiments were limited to small, sub-geophysical scales. Neither atmospheric nor laboratory observations have clearly defined the criterion for wave release.

Known information 2

Rivers issue into the coastal ocean as tidally modulated pulses of fresh water that form positively buoyant gravity currents[23]. The evolving properties of these gravity currents are determined by the initial momentum at the river's mouth, by interactions with coastal currents and winds, and by the Earth's rotation, which tends to turn the current to the right in the Northern Hemisphere. These factors all affect the location, propagation speed and sharpness of the gravity current front.

Unknown information 2
Hypothesis

Satellite images capture single snapshots of waves radiating from the mouth of the Columbia River (Fig. 1; refs 1, 2). However, they provide no information on the waves' internal structure. Nor do they show the sequence of events leading to their generation, since these images are acquired infrequently (<1 per day). Our recent *in situ* observations across a front at the northern edge of the tidally pulsing Columbia River plume provide the necessary sequencing to clearly define the condition for the formation of large-amplitude internal waves from a gravity current. By analogy to topographic release of waves from a sill, this condition is described in terms of a Froude number.

Approach
Proposed solution

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Introduction

1. What's known → ≈ Paragraph 1
2. What's unknown → ≈ Paragraph 2
   - limitations and gaps in previous studies
3. Your question/hypothesis/aim → ≈ Paragraph 3
4. Your experimental approach
5. Why your experimental approach is new and different and important (fills in the gaps)

Corresponds to roughly 3 paragraphs...

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Tips for writing an Introduction

- Keep paragraphs short
- Write for a general audience
  - clear, concise, non-technical
- Take the reader step by step from what is known to what is unknown. End with your specific question.
  - Known -> Unknown -> Question/hypothesis
- Emphasize how your study fills in the gaps (the unknown)
- Explicitly state your research question/aim/hypothesis:
  - "We asked whether"; "Our hypothesis was"; "We tested the hypothesis that"; "Our aim/s were"
- Do not answer the research question (no results or implications).
- Summarize at a high level! Leave detailed descriptions, speculations, and criticisms of particular studies for the discussion.

Statement of problem. What's known

What's unknown/controversial

Road traffic collisions are an important cause of death and disability worldwide. Every year around the world 1.2 million people are killed and up to 50 million are injured or disabled as a result of road traffic collisions.[1] Morbidity from road traffic collisions is expected to increase in future years, and it is estimated that road traffic collisions will move from ninth to third place in the global burden of disease ranking, as measured in disability adjusted life years.[2 3]

Measures to reduce traffic speed are considered essential to reducing casualties on the road.[1 4 5] Speed cameras are increasingly used to help to reduce traffic speeds in the belief that this will reduce road traffic collisions and casualties, and an expansion in the use of speed cameras is under way in many countries, most notably the United Kingdom.[6] The use of speed cameras is controversial, however. Vociferous opponents, including some motoring associated organisations, oppose their use, and cameras are often criticised in the media.[7-9] The lack of readily available evidence of the effectiveness of cameras has made it difficult for road safety and health professionals to engage in an informed debate about the effectiveness of speed cameras.

A previous small non-systematic review of six studies found a 17% reduction in collisions after introduction of speed cameras.[10] Non-systematic reviews can, however, be limited by bias. We aimed, therefore, to systematically assess the evidence for the effectiveness of speed cameras in reducing road traffic collisions and related casualties.

Limitations of previous research.

What we did to answer this question better

Pilkington P. Effectiveness of speed cameras in preventing road traffic collisions and related casualties: systematic review. BMJ 2005;330:331.

Exposures to secondhand tobacco smoke, road vehicle traffic, and diet are some of the most prevalent modifiable risk factors for asthma in children. The effect of parental smoking on wheezing illness and diagnosed asthma in children is well established (1, 2),

Statement of problem. What's known

but evidence that these outcomes are more common in children living close to a main road (3–5)has not been confirmed in all studies (6, 7). Several dietary factors have been linked to asthma (8), and one of the most consistent observations is of an inverse association with fruit intake (9–13).

What's unknown/controversial

The National Schools Fruit Scheme is a government initiative that aims to provide each child aged 4–6 years with free fruit in school every day by winter 2004. As part of an evaluation of the health benefits of this scheme, we have taken the opportunity to investigate the relative importance of fruit intake, exposure to secondhand smoke, and road vehicle traffic in determining the prevalence of asthma in over 11,000 children.

Our question/aim

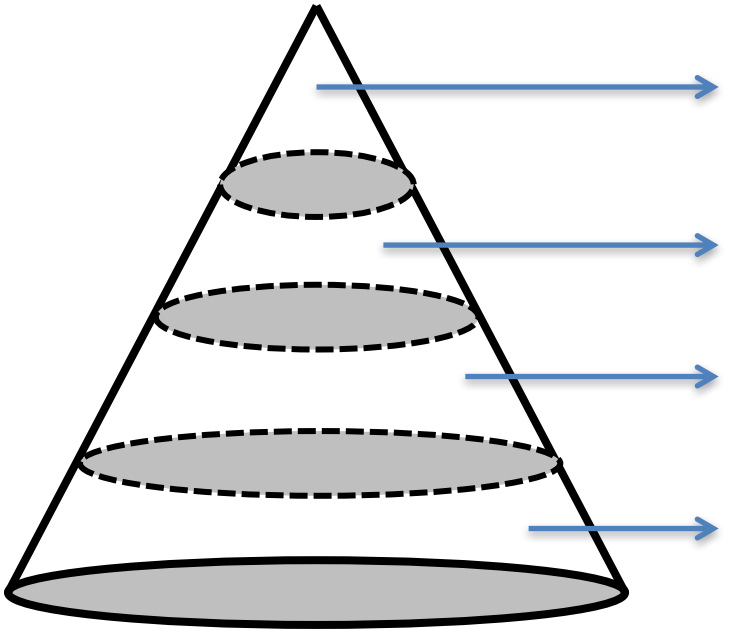
Would also like to know:
How is this study going to do better than previous studies?

Lewis SA, Antoniak M, Venn AJ, Davies L,Goodwin A, Salfield N, Britton J, Fogarty AW. Secondhand Lewis SA et al. Smoke, Dietary Fruit Intake, Road Traffic Exposures, and the Prevalence of Asthma: A Cross-Sectional Study in Young Children. *Am. J. Epidemiol* 2005; 161: 406-411.

Discussion

- Gives you the most freedom
- Gives you the most chance to put good writing on display
- Is the most challenging to write

Invert the cone!



Answer the question asked

Support your conclusion

(your data, others' data)

Defend your conclusion

(anticipate criticisms)

Give the 'big-picture' take-home message

Key: What do my results mean and why should anyone care?

Key finding (answer to the question(s) asked in Intro.)	• Start with: "WE FOUND THAT…" (or something similar) • Explain what the data mean (big-picture!) • State if the findings are novel
Key secondary findings	
Context	• Give possible mechanisms or pathways • Compare your results with other people's results • Discuss how your findings support or challenge the paradigm
Strengths and limitations	• Anticipate readers' questions/criticisms • Explain why your results are robust
What's next	• Recommended confirmatory studies ("needs to be confirmed") • Point out unanswered questions and future directions
The "so what?": implicate, speculate, recommend	• Give the big-picture (human) implications of basic science findings • Tell readers why they should care
Strong conclusion	• Restate your main finding. • Give a final take-home message.

Tips on discussion section

- Showcase good writing!
  - Use the active voice
  - Tell it like a story
- Start and end with the main finding
  - "We found that..."
- Don't travel too far from your data
  - Focus on what your data do prove, not what you had hoped your data would prove
- Focus on the limitations that matter, not generic limitations
- Make sure your take-home message is clear and consistent

Verb tense

- Past, when referring to study details, results, analyses, and background research:
  - We found that
  - Subjects may have experienced
  - Miller et al. found
- Present, when talking about what the data suggest:
  - The greater weight loss suggests
  - The explanation for this difference is not clear.
  - Potential explanations include

Abstract
(ab=out, trahere=pull; “to pull out”)

- Overview of the main story
- Gives highlights from each section of the paper
- Limited length (100-300 words, typically)

- Stands on its own
- Used, with title, for electronic search engines
- Most often, the only part people read

Abstract

1. Background
2. Question/aim/hypothesis
   - "We asked whether," "We hypothesized that,"...etc.
3. Experiment(s)
   - Quick summary of key materials and methods
4. Results
   - Key results found
   - Minimal raw data (prefer summaries)
5. Conclusion: The answer to the question asked/take- home message
6. Implication, speculation, or recommendation

Mimi Zeiger. *Essentials of Writing Biomedical Research Papers*, McGraw Hill Professional, 1999

Abstract: Satellite images have long revealed the surface expression of large amplitude internal waves that propagate along density interfaces beneath the sea surface. Internal waves are typically the most energetic high-frequency events in the coastal ocean, displacing water parcels by up to 100 m and generating strong currents and turbulence that mix nutrients into near-surface waters for biological utilization. While internal waves are known to be generated by tidal currents over ocean-bottom topography, they have also been observed frequently in the absence of any apparent tide-topography interactions. Here we present repeated measurements of velocity, density and acoustic backscatter across the Columbia River plume front. These show how internal waves can be generated from a river plume that flows as a gravity current into the coastal ocean. We find that the convergence of horizontal velocities at the plume front causes frontal growth and subsequent displacement downward of near-surface waters. Individual freely propagating waves are released from the river plume front when the front's propagation speed decreases below the wave speed in the water ahead of it. This mechanism generates internal waves of similar amplitude and steepness as internal waves from tide-topography interactions observed elsewhere, and is therefore important to the understanding of coastal ocean mixing.

Acknowledgement

1. Funding sources
2. Contributors who did not get authorship (e.g. offered materials, advice, or consultation that was not significant enough to merit authorship).
3. Reviewers

Acknowledgments. The authors thank three undergraduate students, Anthony Poggioli, Amanda Gehman, and Stephanie Wei, who helped with the experiments. We would also like to thank D. MacDonald, R. Hetland, and the other members of the MeRMADE project team whose discussions of the work and earlier reviews of this manuscript are very helpful. YY acknowledges the support of Steve and Sylvia Burges Endowed Presidential Fellowship in Civil and Environmental Engineering. Finally, the authors are grateful to NSF for support of the project through Grants OCE-0850847 and OCE-1233068. The authors gratefully acknowledge suggestions from the anonymous reviewers that greatly improved the manuscript.

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References

- Use a computerized bibliographic program.
- Follow journal guide lines (may request alphabetical listing or order of appearance in the text).
- Some journals limit number of references allowed (e.g., 30); figure this out ahead of time!
- Follow journal formatting rules (see: instructions to authors).

Weakest winter South China Sea western boundary current caused by the 2015–2016 El Niño event

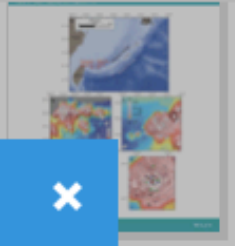
Ruixiang Z

First publish

DOI: 10.100

Cited by: 0

Funding Inform



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How to cite

Zhao, R., and X.dH. Zhu (2016), Weakest winter South China Sea western boundary current caused by the 2015–2016 El Niño event, J. Geophys. Res. Oceans, 121, doi:10.1002/2016JC012252.

Endnote

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Research Anywhere

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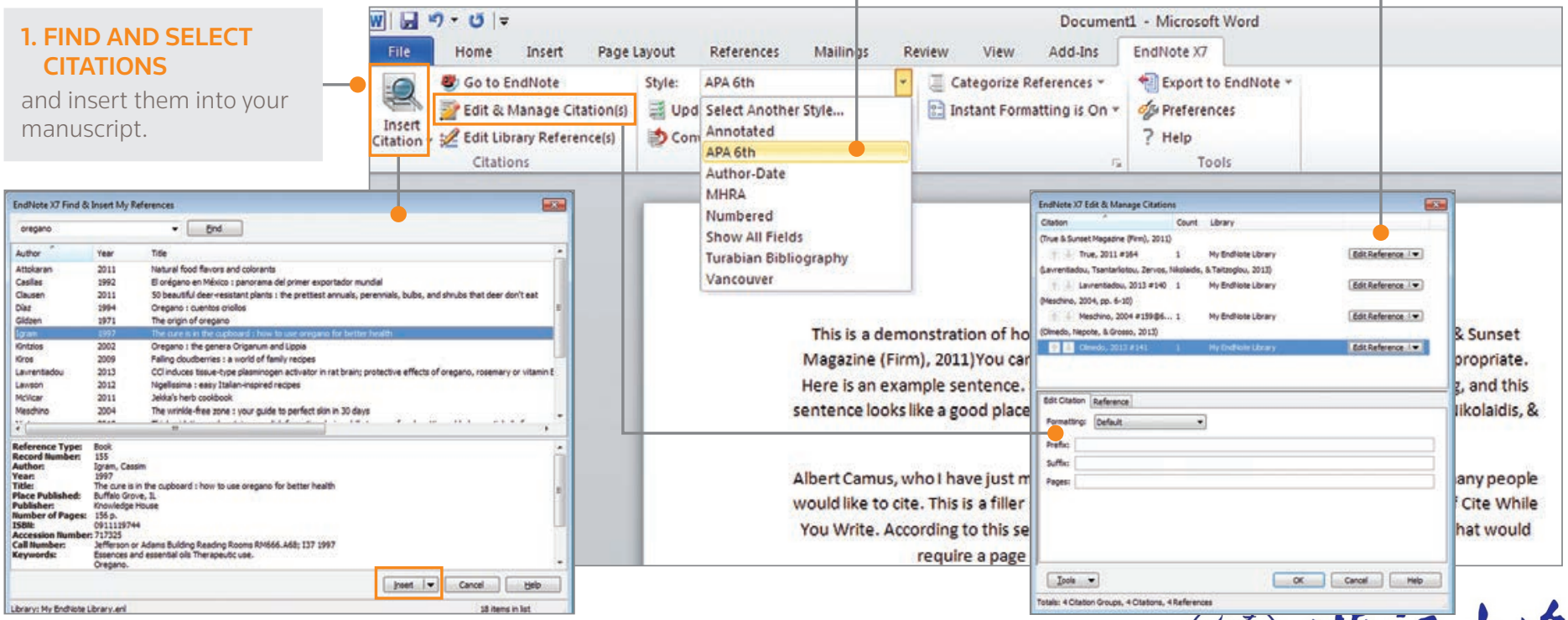

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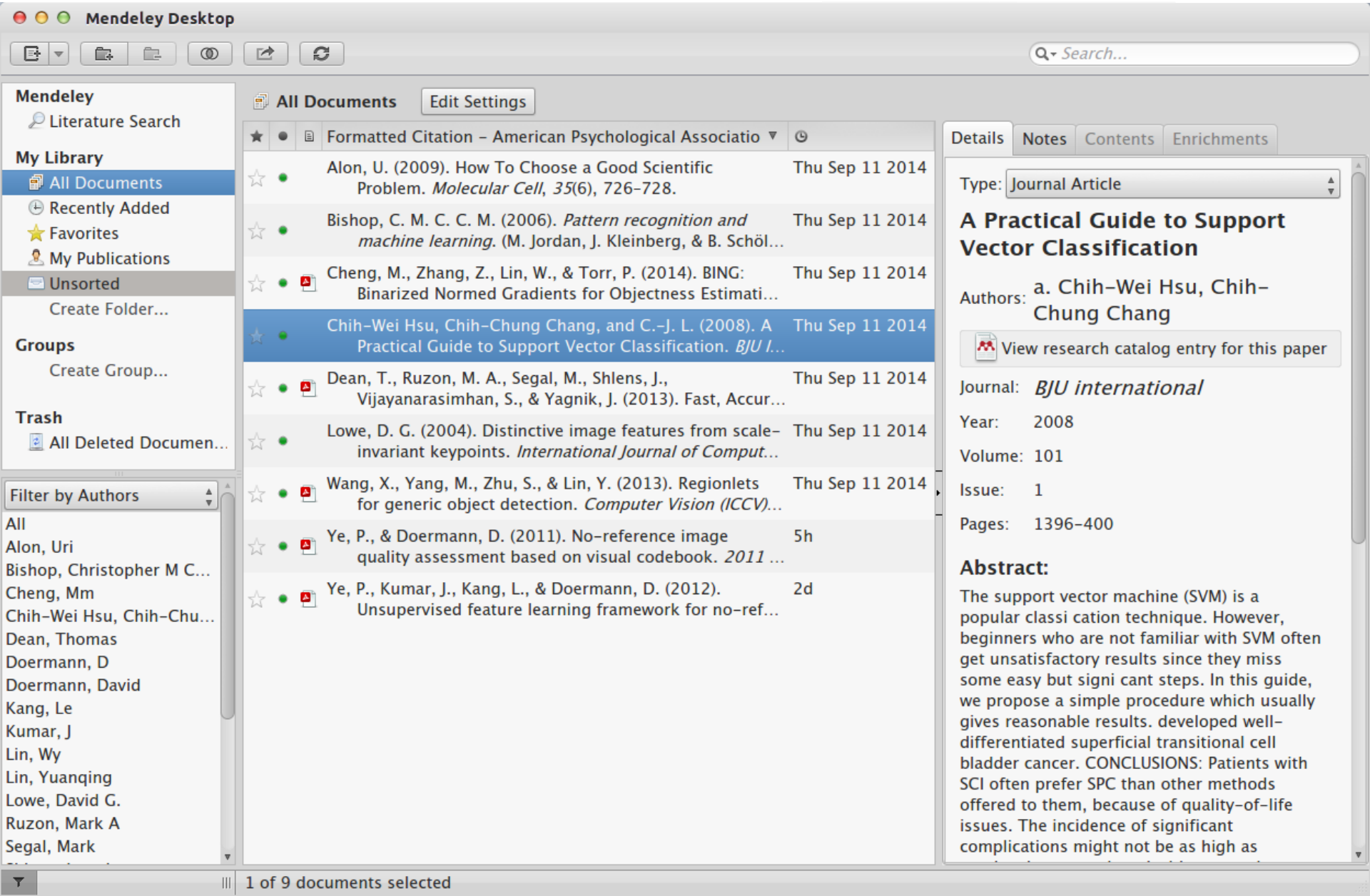
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A Practical Guide to Support Vector Classification
Authors: a. Chih-Wei Hsu, Chih-Chung Chang
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Journal: BJU international
Year: 2008
Volume: 101
Issue: 1
Pages: 1396–400
Abstract:
The support vector machine (SVM) is a popular classi cation technique. However, beginners who are not familiar with SVM often get unsatisfactory results since they miss some easy but signi cant steps. In this guide, we propose a simple procedure which usually gives reasonable results. developed well-differentiated superficial transitional cell bladder cancer. CONCLUSIONS: Patients with SCI often prefer SPC than other methods offered to them, because of quality-of-life issues. The incidence of significant complications might not be as high as
1 of 9 documents selected

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@article{Benjamin1968,
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@BOOK{Simpson1997,
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2. Cite whenever needed in the text (\citet or \citep)
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\bibliographystyle{ametsoc}
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Homework 4

- Write a short introduction (at least three paragraphs)
- Due Dec 31th (Sunday)

1. What's known → ≈ Paragraph 1
2. What's unknown
   - limitations and gaps in previous studies

   ≈ Paragraph 2
3. Your burning question/hypothesis/ aim
4. Your experimental approach
5. Why your experimental approach is new and different and important (fills in the gaps)

   ≈ Paragraph 3