
Research 101

Frank Doyle, UCSB

Acknowledgments: numerous colleagues over my career who have inspired my own approach to research

Definition of Research (and Development)

- "Research' is defined as a systematic study directed toward fuller scientific knowledge or understanding of the subject studied. "Development' is the systematic use of knowledge and understanding gained from research directed toward the production of useful materials, devices, systems, or methods, including design and development of prototypes and processes. [www.nih.gov, 2016]
 - Research means a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge. [Federal Policy for the Protection of Human Subjects: Notices and Rules, Federal Register, 56, June 18, 1991, p. 28013.]
 - NIH
 - *Basic research is performed without thought of practical ends. It results in general knowledge and an understanding of nature and its laws. This general knowledge provides the means of answering a large number of important practical problems, though it may not give a complete specific answer to any one of them. The function of applied research is to provide such complete answers*
 - *Clinical Research: Research conducted with human subjects (or on material of human origin such as tissues, specimens and cognitive phenomena) for which an investigator (or colleague) directly interacts with human subjects. Patient-oriented research includes: (a) mechanisms of human disease, (b) therapeutic interventions, (c) clinical trials, or (d) development of new technologies.*
-

Standards for High Quality Research

[RAND, 2015]

- **The problem should be well formulated, and the purpose of the study should be clear.**
- **The study approach should be well designed and executed.**
- **The study should demonstrate understanding of related studies.**
- **The data and information should be the best available.**
- **Assumptions should be explicit and justified.**
- **The findings should advance knowledge and bear on important policy issues.**
- **The implications and recommendations should be logical, warranted by the findings, and explained thoroughly, with appropriate caveats.**
- **The documentation should be accurate, understandable, clearly structured, and temperate in tone.**
- **The study should be compelling, useful, and relevant to stakeholders and decisionmakers.**
- **The study should be objective, independent, and balanced.**

Research Ethics

- **Ethics:**
 - norms for conduct that distinguish between acceptable and unacceptable behavior [Resnik, 2015]

 - **Research Misconduct** [National Institutes of Health, 2014]
 - Research misconduct is defined as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results.
 - **Fabrication** means making up data or results and recording or reporting them.
 - **Falsification** means manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.
 - **Plagiarism** means the appropriation of another person's ideas, processes, results or words without giving appropriate credit.
-

Why Adhere to Ethical Norms? [Resnik, 2015]

- Norms promote the aims of research, such as knowledge, truth, and avoidance of error
 - Ethical standards promote the values that are essential to collaborative work, such as trust, accountability, mutual respect, and fairness
 - Ethical norms help to ensure that researchers can be held accountable to the public
 - Ethical norms in research also help to build public support for research
 - Many of the norms of research promote a variety of other important moral and social values, such as social responsibility, human rights, animal welfare, compliance with the law, and public health and safety
-

Information Retrieval

- Primary Sources (new results, original author, etc.)
 - Most current, written for the expert, building blocks, checking research landscape
 - Journals, proceedings, technical reports, dissertations, theses, translations, books
 - Secondary Sources (reports, reviews, etc. usually by others)
 - Good starting point, useful for interpretation, useful references, assess primary
 - Monographs, textbooks, lecture notes, manuals, handbooks, dictionaries, surveys
 - Delays in publications
 - Books ~1 year
 - Journal articles 6 months to 3 years
 - Conference Proceedings ~1 year
 - Workshops ~3-6 months
 - Web resources (e.g., arXiv) 0 delay (not peer reviewed)
-

Lifecycle of a Journal Article

- Conduct research (collect data, run simulations, develop theorems, analyze results, etc.)
 - Write article, review w/ co-authors
 - Send article to editor
 - Reviewers evaluate article
 - Editor makes publication decision
 - Revisions (as required – can be multiple rounds)
 - Re-review (as required)
 - Publication pipeline (often backlogged...)
 - Galley proof review
 - On-line version
 - Print/distribute article
 - **From submit to print...can take 6 months to 3+ years!!!**
-

Current IEEE Numbers (in months)

	Sub_2_1stReview	Sub_2_finalDec	Sub_2_ePub	Sub_2_Print
TAC	4.2	11.7	11.8	20
TCST	1.5	6.5	8.3	15.2
TCNS	2.4	3.6	4.8	N/A
CSM	2.9	7.6	13.3	13.3

Searching for Information...

- Bibliography databases – valuable resource, very broad
 - **PUBMED, INSPEC, COMPENDEX, Science Citation Index, many other...**
 - Catalogs – specific location
 - MELVYL, Library of Congress (loc.gov), on-line bookstores (e.g., amazon.com)
 - Patents
 - US Patent Office (uspto.gov)
 - On-line Journals
 - Many have searchable contents
 - Subscribing to on-line TOCs (highly recommended!!!)
 - **Harvard Library www site**
-

Staying Current

- Read main journals regularly (monthly)
 - Attend scientific meetings (or review proceedings), incl. department seminars
 - Eletter on Systems, Control, and Signal Processing
 - CAST e-mail list
 - Several Sys Bio listserves
 - Contents Direct (Elsevier), etc.
 - Surf the Web
 - Professional societies
 - Personal contacts
 - Seminars, etc. (incl. HMS, FAS, MIT, etc.)
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Journal Evaluation

- Impact Factor
 - Average number of times recent articles (< 2 years) cited in cover year
 - Immediacy Index
 - Average number of times a journal's current articles are cited in same year
 - Cited Half-life
 - Number of journal publication years which account for 50% of total citations in current year
 - Prestige Factor
 - Similar to impact factor, but ignores review articles
 - Eigenfactor
 - Total Cites
 - In year of coverage
 - Total Number of Articles
 - In year of coverage
 - Reputation
-

Journal Evaluation

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Bibliometric Indicators: Why Do We Need More Than One?

2012 IEEE Publication Services and Product - Strategic Planning Committee[†]

Abstract

This paper provides an overview of the main features of several bibliometric indicators which have been proposed in the last few decades. Their pros and cons are highlighted and compared with the features of the well known Impact Factor to show how alternative metrics are specifically designed to address the flaws that the Impact Factor has been shown to have especially in the last few years. We also report the results of recent studies in the bibliometric literature showing how the scientific impact of journals as evaluated by bibliometrics is a very complicated matter and *it is completely unrealistic to try to capture it by any single indicator*, such as the Impact Factor or any other. As such, we conclude that the adoption of more metrics, with complementary features, to assess journal quality would be very beneficial since it would both offer a more comprehensive and balanced view of each journal in the space of scholarly publications, as well as eliminate the pressure on individuals and their incentive to do metric manipulation which is an unintended result of the current (mis)use of the Impact Factor as the “gold standard” for publication quality.

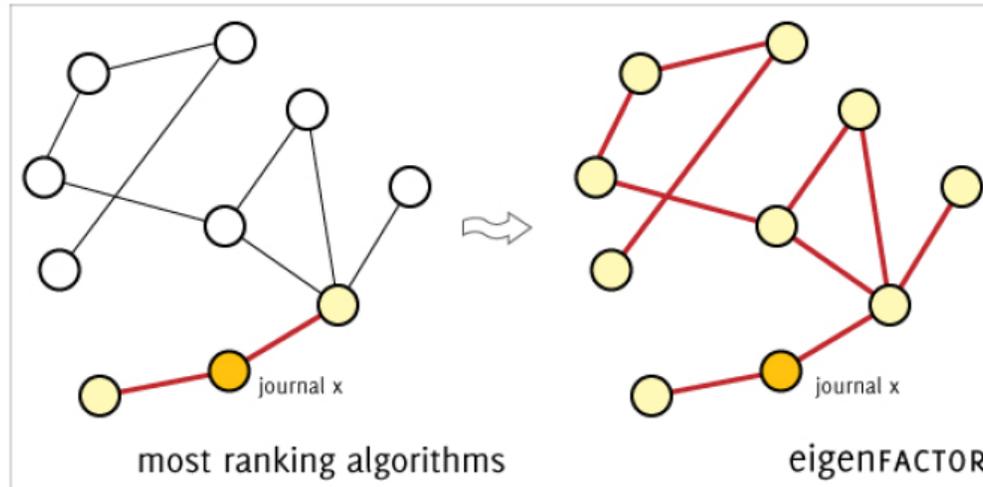
Eigenfactor and Article Influence: metrics developed by Carl Bergstrom

- **Eigenfactor:** a measure of the journal's total importance to the scientific community, using an iterative algorithm to weight citations (similar to the PageRank algorithm used for Google)
- **Article Influence Score:** a measure of the average influence of each of its articles over the first five years after publication
- Both metrics use data from Thomson Reuters Science Citation Index and Journal Citation Reports (JCR) and are reported in the JCR
- FAQs at <http://www.eigenfactor.org/faq.htm>

Eigenfactor Introduction

Scholarly references join journals together in a vast network of citations. Eigenfactor algorithms use the structure of the entire network (instead of purely local citation information) to evaluate the importance of each journal.

The Eigenfactor™ score of a journal is an estimate of the percentage of time that library users spend with that journal.



Source for all slides: <http://www.eigenfactor.org/>

Eigenfactor and Article Influence Scores

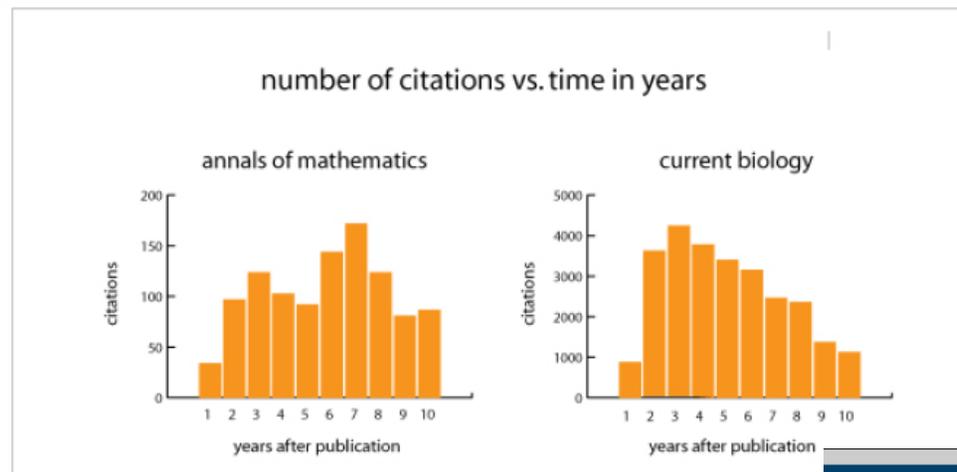
Sherry Markowitz
IEEE Research Librarian

Presented first on Nov 17, 2010 at
TAB PC Meeting, also used as
background Slides for Discussion on
Impact Factor at 2011 POE, Boston,
April 8

Eigenfactor uses a 5-year history

***Eigenfactor*TM scores and *Article Influence*TM scores rely on 5-year citation data.**

In many research areas, articles are not frequently cited until several years after publication. Therefore, measures that only look at citations in the first two years after publication can be misleading.



Eigenfactor and Article Influence Scores

Sherry Markowitz
IEEE Research Librarian

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April 8

Article Influence Introduction

A journal's *Article Influence* score is a measure of the average influence of each of its articles over the first five years after publication. The Article Influence Score measures the influence, per article, of a given journal and as such is directly comparable to Thomson-Reuters' impact factor metric. *Article Influence* scores are normalized so that the mean article in the entire Thomson Journal Citation Reports (JCR) database has an article influence of 1.00.

Top 10 non-review journals by *Article Influence*TM Score (2006)

1. Science
2. Nature
3. Cell
4. New England Journal of Medicine
5. Nature Immunology
6. Quarterly Journal of Economics
7. CA-A Cancer Journal For Clinicians
8. Nature Medicine
9. Nature Genetics
10. Nature Materials

Top 10 social science journals by *Article Influence*TM score (2006)

1. Quarterly Journal of Economics
2. Journal of Economic Literature
3. Journal of Political Economy
4. Journal of Finance
5. Econometrica
6. Journal of Financial Economics
7. Review of Economic Studies
8. Review of Financial Studies
9. Journal of Economic Perspectives
10. Review of Accounting Studies

Eigenfactor and Article Influence Scores

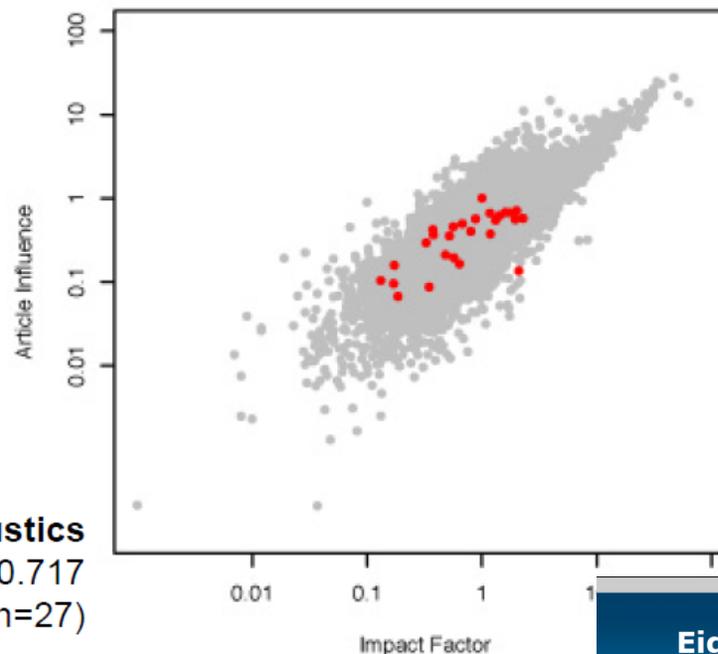
Sherry Markowitz
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April 8

Article Influence Correlation with Impact Factor

The Article Influence Score measures the influence, per article, of a given journal and such is directly comparable to Thomson-Reuters' impact factor metric.

Despite the correlations, there are many individual journal rankings that change considerably from one measure to the next.



Acoustics

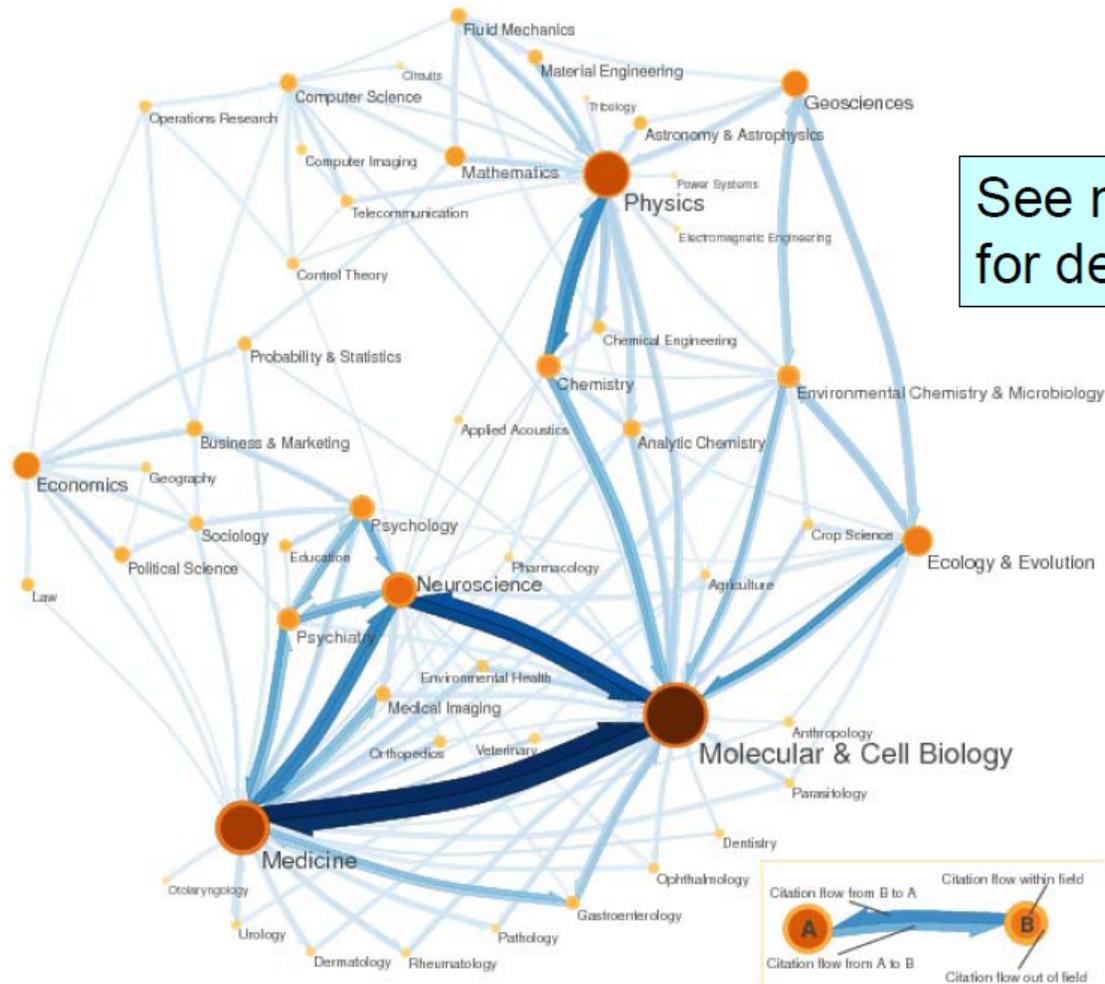
Correlation coefficient = 0.717
(n=27)

Eigenfactor and Article Influence Scores

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background Slides for Discussion on
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April 8

Eigenfactor maps citation traffic from 2004 JCR data



See notes field for details

Eigenfactor and Article Influence Scores

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TAB PC Meeting, also used as
background Slides for Discussion on
Impact Factor at 2011 POE, Boston,
April 8

Select All	Full Journal Title	Total Cites	Journal Impact Factor	Eigenfactor Score
1	IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS	27,005	6.383	0.07119
2	AUTOMATICA	22,200	3.635	0.05102
3	IEEE TRANSACTIONS ON AUTOMATIC CONTROL	28,452	2.777	0.04901
4	JOURNAL OF MACHINE LEARNING RESEARCH	10,109	2.450	0.03248
5	INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY	12,461	1.568	0.02240
6	IEEE TRANSACTIONS ON CONTROL SYSTEMS TECHNOLOGY	6,922	2.818	0.01774
7	IEEE Transactions on Industrial Informatics	3,779	4.708	0.01639
8	SIAM JOURNAL ON CONTROL AND OPTIMIZATION	5,965	1.491	0.01424
9	IET Control Theory and Applications	3,787	1.957	0.01353
10	SYSTEMS & CONTROL LETTERS	5,606	1.908	0.01284
11	IEEE-ASME TRANSACTIONS ON MECHATRONICS	4,858	3.851	0.01217
12	INTERNATIONAL JOURNAL OF ROBUST AND NONLINEAR CONTROL	3,482	2.527	0.01053
13	INTERNATIONAL JOURNAL OF CONTROL	5,452	1.880	0.00961
14	JOURNAL OF THE FRANKLIN INSTITUTE-ENGINEERING AND APPLIED MATHEMATICS	3,850	2.327	0.00957
15	CONTROL ENGINEERING PRACTICE	4,432	1.830	0.00881

Select
All

	Full Journal Title	Total Cites	Journal Impact Factor	Eigenfactor Score
1	BIOMATERIALS	95,025	8.387	0.14892
2	Acta Biomaterialia	20,966	6.008	0.05394
3	PHYSICS IN MEDICINE AND BIOLOGY	21,090	2.811	0.03988
4	JOURNAL OF BIOMECHANICS	24,856	2.431	0.03283
5	IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING	14,781	2.468	0.02454
6	IEEE TRANSACTIONS ON MEDICAL IMAGING	13,784	3.756	0.02450
7	JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A	15,442	3.263	0.02366
8	ANNALS OF BIOMEDICAL ENGINEERING	8,405	2.887	0.01771
9	CLINICAL ORAL IMPLANTS RESEARCH	11,968	3.464	0.01661
10	Journal of the Mechanical Behavior of Biomedical Materials	4,277	2.876	0.01469

Select All	Full Journal Title	Total Cites	Journal Impact Factor	Eigenfactor Score
1	BIOLOGICAL REVIEWS	8,895	10.725	0.01858
2	PLOS BIOLOGY	25,871	8.668	0.07966
3	Physics of Life Reviews	1,124	8.615	0.00275
4	eLife	7,951	8.303	0.06869
5	BMC BIOLOGY	3,908	6.967	0.01610
6	PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES	34,017	5.847	0.07899
7	FASEB JOURNAL	41,645	5.299	0.06404
8	QUARTERLY REVIEW OF BIOLOGY	3,473	5.000	0.00273
9	PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES	41,127	4.823	0.09362
10	BIOESSAYS	8,919	4.725	0.01802

Select All	Full Journal Title	Total Cites	Journal Impact Factor	Eigenfactor Score
1	Cell Metabolism	21,343	17.303	0.08897
2	Lancet Diabetes & Endocrinology	2,026	16.320	0.01135
3	Nature Reviews Endocrinology	4,758	15.432	0.02265
4	ENDOCRINE REVIEWS	12,433	14.898	0.01262
5	JOURNAL OF PINEAL RESEARCH	6,914	9.314	0.00780
6	TRENDS IN ENDOCRINOLOGY AND METABOLISM	6,826	8.964	0.01940
7	DIABETES CARE	60,339	8.934	0.11723
8	FRONTIERS IN NEUROENDOCRINOLOGY	3,407	8.852	0.00728
9	DIABETES	51,024	8.784	0.08696
10	Obesity Reviews	8,237	7.510	0.02501
11	ANTIOXIDANTS & REDOX SIGNALING	17,009	7.093	0.04558
12	DIABETOLOGIA	27,066	6.206	0.05332
13	DIABETES OBESITY & METABOLISM	6,909	6.198	0.02245
14	FREE RADICAL BIOLOGY AND MEDICINE	35,011	5.784	0.04786
15	JOURNAL OF BONE AND MINERAL RESEARCH	23,684	5.622	0.04171

Guidelines for Authorship

- Metrics for author (vs. acknowledgment)
 - Must be able to defend work in a seminar
 - Must have participated in **both** conception/execution of work AND drafting/revising of manuscript
 - Co-author must be able to identify specific contribution
 - Author order is generally in order of contribution (work/writing)
 - FJDIII is generally last & corresponding author
- Other participation typically (gratefully!) is “acknowledged”
 - Brief discussions, minor edits, collect data, loan equipment, fund project, training
- First author assume responsibility for follow-through (revisions, galleys)
- FJDIII is not necessarily always a co-author

[Acknowledgments to E. McFarland]

Guidelines for Authorship (cont'd)

- ICMJE advice

- *Authorship confers credit and has important academic, social, and financial implications. Authorship also implies responsibility and accountability for published work. The following recommendations are intended to ensure that contributors who have made substantive intellectual contributions to a paper are given credit as authors, but also that contributors credited as authors understand their role in taking responsibility and being accountable for what is published.*

- ICMJE Authorship Criteria

- Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; **AND**
 - Drafting the work or revising it critically for important intellectual content; **AND**
 - Final approval of the version to be published; **AND**
 - Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.
-

Guidelines for Authorship (cont'd)

- ICMJE on “Non-authors”

- *Contributors who meet fewer than all 4 of the above criteria for authorship should not be listed as authors, but they should be acknowledged. Examples of activities that alone (without other contributions) do not qualify a contributor for authorship are acquisition of funding; general supervision of a research group or general administrative support; and writing assistance, technical editing, language editing, and proofreading.*



Publisher/ organization	Standard of authorship	Comments
American Chemical Society	Authors “share responsibility and accountability for the results.” (www.acs.org)	No further details are provided.
American Psychological Association	Authorship must include those who have made substantial contributions to a study such as “formulating the problem or hypothesis, structuring the experimental design, organizing and conducting the statistical analysis, interpreting the results, or writing a major portion of the paper.” (http://www.apa.org/ethics/code/index.aspx)	Although these guidelines list many other forms of contributions to a study that do not constitute authorship, they state that combinations of these and other tasks might justify authorship. It also considers institutional positions, such as Department Chair, insufficient for authorship.
Annals of Internal Medicine	“Authors should meet all of the following criteria, thereby allowing persons named as authors to accept public responsibility for the content of the paper: 1) Conceived and planned the work that led to the article or played an important role in interpreting the results, or both. 2) Wrote the paper and/or made substantive suggestions for revision. 3) Approved the final version.” (http://annals.org/site/misc/ifora.xhtml)	As for the ICMJE, all of these conditions must be met, although there is room for interpreting the responsibilities of each author under condition 1.
British Sociological Association	“Everyone who is listed as an author should have made a substantial direct academic contribution (that is, intellectual responsibility and substantive work) to at least two of the four main components of a typical scientific project or paper: a) conception or design; b) data collection and processing; c) analysis and interpretation of the data; d) writing substantial sections of the paper (for example, synthesising findings in the literature review or the findings/results section).” (http://www.britisoc.co.uk/Library/authorship_01.pdf)	—
Elsevier	“Authorship should be limited to those who have made a significant contribution to the conception, design, execution, or interpretation of the reported study. All those who have made significant contributions should be listed as co-authors. Where there are others who have participated in certain substantive aspects of the research project, they should be acknowledged or listed as contributors.” (www.elsevier.com/ethicalguidelines)	Elsevier is more realistic than the ICMJE, as it only requires authors to fulfil one of the roles listed—it uses the language of ‘or’, rather than ‘and’. Ironically, many Elsevier journals follow the ICMJE guidelines.

ICMJE	Someone is an author if and only if he or she has done all of the following: “1) made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; 2) drafted the article or revised it critically for important intellectual content; 3) approved of the final version to be published. Acquisition of funding, collection of data, or general supervision of the research group alone does not constitute authorship.” (ICMJE, 2006)	—
Proceedings of the National Academy of Sciences of the USA	“Authorship should be limited to those who have contributed substantially to the work. The corresponding author must have obtained permission from all authors for the submission of each version of the paper and for any change in authorship. All collaborators share some degree of responsibility for any paper they co-author. Some co-authors have responsibility for the entire paper as an accurate, verifiable report of the research. These include co-authors who are accountable for the integrity of the data reported in the paper, carry out the analysis, write the manuscript, present major findings at conferences, or provide scientific leadership to junior colleagues. Co-authors who make specific, limited contributions to a paper are responsible for their contributions but may have only limited responsibility for other results.” (http://www.pnas.org/site/misc/iforc.shtml#ii)	This model and interpretation of co-authorship seems amenable to the idea of international writing CPCs, as it assumes that each author need not fulfil all of the criteria. However, it is vague in terms of what contributions constitutes authorship.
US National Academies and Online Ethics Center	“An author who is willing to take credit for a paper must also bear responsibility for its contents. Thus, unless a footnote or the text of the paper explicitly assigns responsibility for different parts of the paper to different authors, the authors whose names appear on a paper must share responsibility for all of it.” (http://www.nationalacademies.org/ ; http://www.onlineethics.org)	This is far more realistic than the ICMJE model, as each CPC member would need to assume collective responsibility for a research project and its published paper.

Authorship Case Studies

Reflections on Determining Authorship Credit and Authorship Order on Faculty–Student Collaborations

Mark A. Fine and Lawrence A. Kurdek

November 1993 • American Psychologist

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Vol. 48, No. 11, 1141–1147

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Authorship Case Study

Case 1

A student in a clinical psychology doctoral program conducted dissertation research at a practicum site. The initial idea for the study was developed between the practicum supervisor (a psychologist) and the student. The dissertation committee was composed of the chair, who was a psychology faculty member in the student's graduate department; the practicum supervisor; and another psychology faculty member in the same department. After the dissertation was approved, the chair of the committee raised the possibility of writing a journal article based on the dissertation. The student agreed to write the first and subsequent drafts of the manuscript, the committee chair agreed to supervise the writing process, and the practicum supervisor agreed to review drafts of the paper. On initial drafts, the student, practicum supervisor, and committee chair were first, second, and third authors, respectively. However, after numerous drafts, the student acknowledged losing interest in the writing process. The committee chair finished the manuscript after extensively reanalyzing the data.

Authorship Case Study

Case 2

An undergraduate student asked a psychology member to supervise an honors thesis. The student proposed a topic, the faculty member primarily developed the research methodology, the student collected and entered the data, the faculty member conducted the statistical analyses, and the student used part of the analyses for the thesis. The student wrote the thesis under very close supervision by the faculty member. After the honors thesis was completed, the faculty member decided that data from the entire project were sufficiently interesting to warrant publication as a unit. Because the student did not have the skills necessary to write the entire study for a scientific journal, the faculty member did so. The student's thesis contained approximately one third of the material presented in the article.

Authorship Case Study

Case 3

A psychologist and psychiatrist collaborated on a study. A student who was seeking an empirical project for a master's thesis was brought into the investigation after the design was developed. The student was given several articles in the content area, found additional relevant literature, collected and analyzed some of the data, and wrote the thesis under the supervision of the psychologist. After the thesis was completed, certain portions of the study, which required additional data analyses, were written for publication by the psychologist and the psychiatrist. The student was not asked to contribute to writing the journal article.

Authorship Case Study

Case 4

An undergraduate student completed an honors thesis under the supervision of a psychology faculty member. The student chose the thesis topic and took initiative in exploring extant measures. Because no suitable instruments were found, the student and the faculty member jointly developed a measure. The student collected and entered the data. The faculty member conducted the statistical analyses. The student wrote the thesis with the faculty member's guidance, and few revisions were required. Because the student lacked the skills to rewrite the thesis as a journal article, the faculty member wrote the article and the student was listed as first author. Based on reviewers' comments to the first draft of the manuscript, aspects of the study not included in the thesis needed to be integrated into a major revision of the manuscript.

Authorship: Practices to Minimize Problems

- Early in project, discuss criteria for authorship decisions
 - Assign specific responsibilities early in project and early in paper-writing
 - Allow for re-examination of role/order/etc. as circumstances change
 - Open discussion with project collaborators
 - Authorship committee
 - Circulate drafts early without author list and invite question/contribution
-

Ethics in Publishing

- Plagiarism – fairly clear cut
 - Overlapping content (often referred to as “Self-plagiarism”) – less obvious
 - New tools for detecting overlapping content
 - iThenticate
-

Ethics in Publishing

ns | IEEE Co x CSS Policy on overlapping x

www.ieeecss.org/publications/css-policy-overlapping-conferencejournal-submissions



IEEE Control Systems Society



Home » CSS Policy on overlapping conference/journal submissions

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UBIQUITOUS

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PUBLICATIONS

CONFERENCES

TECHNICAL ACTIVITIES

MEMBER ACTIVITIES

FINANCIAL ACTIVITIES

GOVERNANCE

NOTES TO CSS

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CSS POLICY ON OVERLAPPING CONFERENCE/JOURNAL SUBMISSIONS

The CSS Policy on overlapping submissions is as follows: identical submission for publication to a conference record, or as a journal article, book chapter, or for publication in a second conference record etc. is not allowed. Publication of an idea or result in both conference proceedings and journal publication may be considered acceptable, provided:

- i) There is value added material as well as novelty in the journal version of the writeup. "Value added material" may be interpreted as:
 - a. detailed or significantly improved proofs of theorems
 - b. experimental, theoretical, or numerical results that expand the range of the results originally presented
 - c. detailed description of practical implementation of the results

The criterion of "value added material" will be enforced at the discretion of the Editor-in-Chief

- ii) The journal version cites the conference version and the author should inform the journal editor about all related submissions that might be regarded as significantly overlapping, redundant or duplicate publication. The author should explain the overlap, as well as the novelty of the journal submission. The conference version (accepted or submitted) should be made available for the review process of the journal version (for example, by posting it on a freely accessible website).

- iii) The conference version is submitted first, and the journal version normally is not submitted prior to receiving the reviews from the conference editorial process. If the expanded version with the "substantially different material" is submitted to the journal before receiving the reviews from the conference editorial process, the authors need to agree to the following: "should both versions be accepted, then the final conference version will also be provided to the journal editors so they can check for the "substantially different material" criteria.

Ethics in Publishing



The world's largest professional association for the advancement

Identifying Plagiarism

Select Language

Powered by [Google Translate](#)

When does plagiarism occur? Is there an established percentage, a rule of thumb, a saturation point that we can use to determine when plagiarism has taken place? Or is it simply that "plagiarism is plagiarism"? The answer may lie somewhere between the stark (and perhaps too simple) dictum and the convenience of ready-made measures. In most cases, the dictum can be applied appropriately: plagiarism is plagiarism.

However, there are in fact degrees of plagiarism: one can steal an entire paper, or a section of a paper, or a page, a paragraph or a sentence. Even copying phrases without credit and quotation marks can be considered plagiarism. In other words, paraphrasing done improperly can qualify as plagiarism.

So, there are several basic factors to consider when evaluating a case of possible plagiarism:

Amount or quantity (full paper, a section of a paper, a page, a paragraph, a sentence, phrases)

Use of quotation marks for all copied text

Appropriate placement of credit notices

Improper paraphrasing

On this Page:

[Possible plagiarism scenarios](#)

[Plagiarism, in short](#)

[Discussion](#)

Ethics in Publishing

Possible plagiarism scenarios

Potentially complicating the effort to identify plagiarism is the fact that each of the above basic factors can be combined with other factors, creating a range of possible plagiarism scenarios. Here, then, is a full list of possible scenarios, starting with the worst case:

1. **Uncredited Verbatim Copying of a Full Paper, or Uncredited Verbatim Copying of a Major Portion (more than 50%) within a Single Paper**--An instance is where a large section of the original paper is copied without quotation marks, credit notice, reference, and bibliography. This case also includes instances where different portions of a paper are copied without attribution from a number of papers by other authors, and the sum of plagiarized material is more 50%, or

Uncredited Verbatim Copying within More than a Single Paper by the Same Author(s)--This includes instances where more than one paper by the offending author(s) has been found to contain plagiarized content, and all the percentages of plagiarized material in each of the discovered papers sum to greater than 50%.
2. **Uncredited Verbatim Copying of a Large Portion (greater than 20% and up to 50%) within a Paper**--An instance is where a section of the original paper is copied from another paper without quotation marks, credit notice, reference, and bibliography. This case also includes instances where different portions of a paper are copied without attribution from a number of papers by other authors, and the sum of copying results in a large portion of plagiarized material (up to 50%) in the paper, or

Uncredited Verbatim Copying within More than One Paper by the Same Author(s)--This includes instances where the sum of plagiarized material from the different papers would constitute the equivalent of a large portion (greater than 20% and up to 50%) of the discovered paper with the fewest words.
3. **Uncredited Verbatim Copying of Individual Elements (Paragraph(s), Sentence(s), Illustration(s), etc.) Resulting in a Significant Portion (up to 20%) within a Paper**--An instance could be where portions of original paper are used in another paper without quotation marks, credit notice, reference, and bibliography.
4. **Uncredited Improper Paraphrasing of Pages or Paragraphs**. Instances of improper paraphrasing occur when only a few words and phrases have been changed or when the original sentence order has been rearranged; no credit notice or reference appears with the text.
5. **Credited Verbatim Copying of a Major Portion of a Paper without Clear Delineation**. Instances could include sections of an original paper copied from another paper; credit notice is used but absence of quotation marks or offset text does not clearly reference or identify the specific, copied material.

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Scientific Writing

- Purpose
 - Report findings (papers, books, reports)
 - Justify research (thesis)
 - Propose research (proposal)

 - Target audience
 - Assumptions
 - Scope/introduction
 - Experts vs. general audience

 - Focus on main points
 - What are main results?
 - Is your contribution
 - Theoretical?
 - Application?
-

PREPARATION OF MANUSCRIPTS

(Revised January 2003)

Submission of Manuscripts

Send six copies of manuscripts to be considered for publication with a cover letter and signed copyright status form (see copy in each January issue) to Dr. Donald R. Paul, Editor, *Industrial & Engineering Chemistry Research*, Department of Chemical Engineering, University of Texas at Austin, 1 University Station C0400, Austin, TX 78712-1062; for *express mail* delivery add Speedway at Dean Keeton, tel. (512) 471-7722. Clear duplicated copies on white bond paper are acceptable. If pertinent references are "in press" or unpublished, furnish six copies of work or sufficient information to enable reviewers to evaluate the manuscript.

Please include with the cover letter a list of qualified individuals (with their addresses) that the Editors may consider for the peer review. These recommendations should go beyond the well-known names in the field that would be obvious to the Editors. The cover letter should indicate if drawings or photographs are to be reproduced in color.

Correspondence regarding accepted papers and proofs should be directed to Journal Publications, American Chemical Society, 2540 Olentangy River Road, P.O. Box 3330, Columbus, OH 43210.

Please return your reprint order form, along with the purchase order or check, using the enclosed envelope addressed to Cadmus Professional Communications. Reprints will be shipped within 2 weeks after the printed journal date. Corresponding authors will receive 50 free electronic reprints via an Electronic Reprint URL.

There are no page charges for *Industrial & Engineering Chemistry Research*.

Revision of Manuscripts

After the peer review process has been completed, manuscripts may be returned to the author for revision. Three copies of the revised manuscript must be returned to the editor within three months; otherwise, it will be considered withdrawn. A detailed account of how the author has responded to the reviewers' comments should accompany the revised manuscript. In the event of major revisions, revised manuscripts may be reviewed by some or all of the original reviewers. If only minor revisions are involved, the editors examine the revised manuscript in light of the recommendations of the reviewers without seeking further opinions.

World Wide Web Publishing

Notice: Documents accepted for publication in ACS Journals will be posted in the World Wide Web edition of the journal as soon as they are ready for publication, that is, when galley proofs are corrected and all author concerns are resolved. This can occur anywhere from 2 to 11 weeks in advance of the cover date of the printed issue. Authors should take this into account when planning their intellectual and patent activities related to a paper. The actual date on which the document is posted on the Web is recorded in a

separate line at the bottom of the first page of the document in the printed issue.

Preparation of Manuscripts

For general style, consult recent issues of the journal and *The ACS Style Guide* (1997; available from Oxford University Press, Order Department, 201 Evans Road, Cary, NC 27513).

Abstract. Authors' abstracts are used directly for *Chemical Abstracts*. They should be a clear, concise (100–150 words) summary—informative rather than descriptive—giving the scope and purpose, methods or procedures, significant new results, and conclusions. A list of keywords should be provided at the end of the abstract.

Title. Use specific and informative titles; they should be as brief as possible, consistent with the need for defining the subject area covered by the paper and for indexing and retrieval purposes.

Authorship. Use first name, second initial, and surname of each author. Give complete mailing address of place where work was conducted; include e-mail address and fax number. If current address is different, include it in a footnote on the title page. The name of the author to whom inquiries about the paper should be addressed should be marked with an asterisk. It is the responsibility of the submitting author to ensure that the manuscript and any revisions have the full approval of all coauthors.

Text. Assume the reader is not a novice in the field. Include only as much history as is needed to provide background for the particular material covered in your paper. Sectionalize the article and insert appropriate headings. Do not use footnotes in the text. Manuscripts should be typed double spaced (one side only) on 22- × 28-cm (8½ × 11 in.) or A4 paper. Each page should be numbered.

Illustrations. The quality of the illustrations printed in your paper depends on the quality of the originals provided by the author. Figures cannot be modified or enhanced by the journal production staff. Whenever possible, the graphics files furnished by authors on disk with revised submissions of accepted manuscripts are used in production of the Journal. Hardcopy graphics furnished with submissions are digitized during journal production. Contrast is important. Use dark black ink. Hardcopy graphics should be printed on a high-resolution laser printer on smooth, opaque white paper. Also, remove all color from graphics, except for those graphics that you would like to have considered for publication in color (see Color section below for details).

Illustrations must fit a one- or two-column format on the journal page: For efficient use of journal space, single column illustrations are preferred.

	Single (preferred)	Double
Width		
minimum		10.5 cm (4.13 in.)
maximum	8.25 cm (3.25 in.)	17.78 cm (7 in.)
Maximum depth	24 cm (9.5 in.)	24 cm (9.5 in.)

Scientific Writing – Grammar

- Strunk and White: *The Elements of Style*
 - Terse, good rules
 - (Rule 17): "Omit needless words."
 - *definitely* proved,
 - orange *in color*
 - *viable* alternative
 - worst-case *maximum possible* error.
 - *because of the fact that*
 - (Rule 11): A "participial phrase at the beginning of a sentence must refer to the grammatical subject. Sentences violating rule 11 are often ludicrous." For example:

"Assuming a $\ll 1$ and substituting in Eq. 12, the relation becomes Eq. 14."

Equations neither assume nor substitute. It should read:

"When a $\ll 1$, Eq. 12 can be simplified to become Eq. 14."

Scientific Writing – Grammar

- Strunk and White: *The Elements of Style*

- (Rule 15): Put statements in positive form. Avoid statements like:

"None of these integers were non-negative."

Say instead:

"All of these integers were negative."

- See also: <http://www.strunkandwhite.com/book.html>

- *The Chicago Manual of Style*
-

Scientific Writing – More Tips

- numbers (eight vs. 8)
 - units (metric)
 - affect vs. effect
 - data vs. datum
 - that vs. which
 - insure vs. ensure
 - isolated “this”
 - colloquialisms
-

Scientific Writing – Bibliography

- Bibliography Rules [Standler, 1999]
 - All direct quotations from another author must be cited. ***There is no exception!***

 - All ***substantial*** information taken from another source should be cited
 - give due credit
 - relieve responsibility for accuracy
 - lead reader to more information
 - date ideas

 - Spellcheck and double-check bibliography
 - Make sure all dates/places/pages are included
-

9 Steps to Better Technical Writing

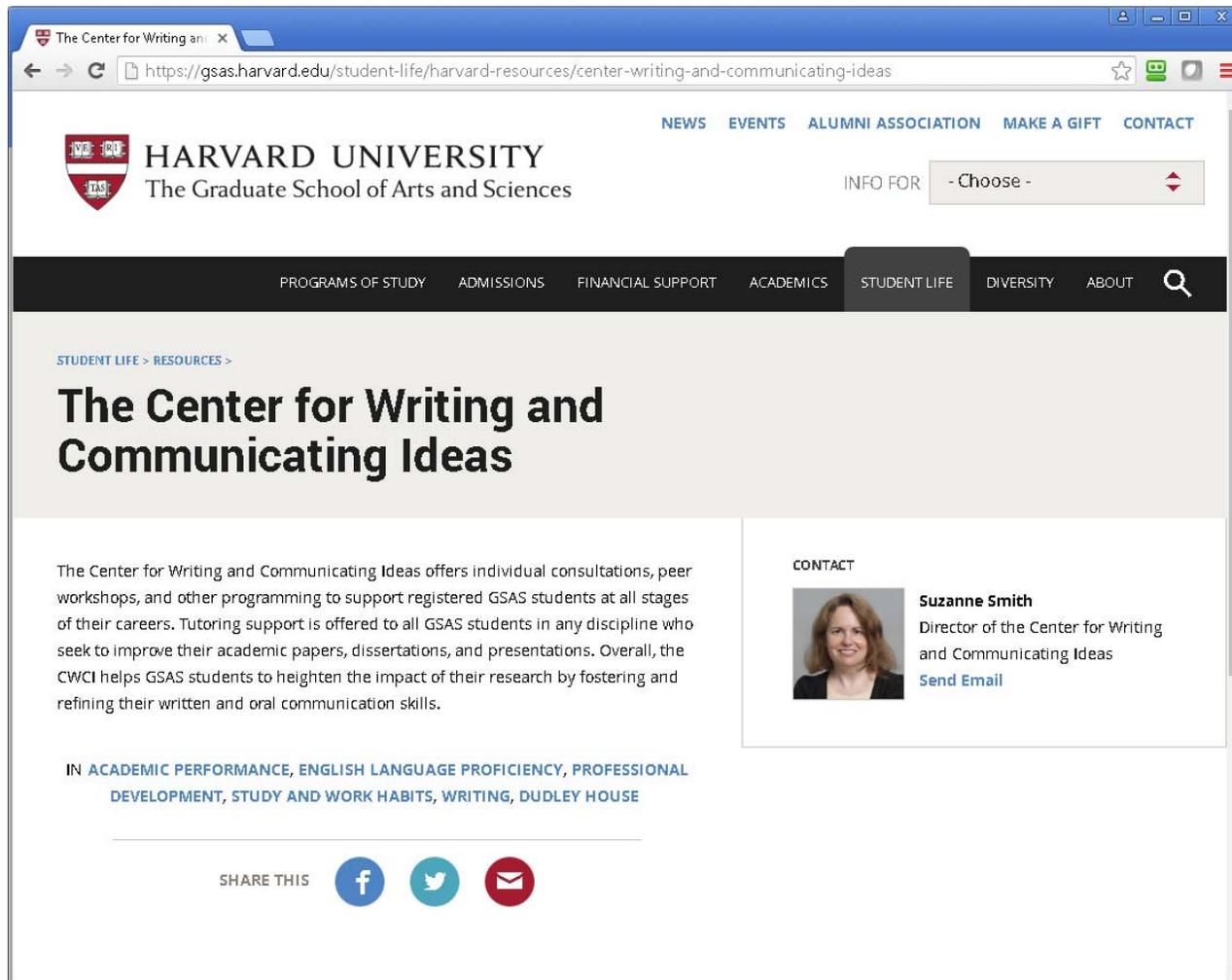
[Pfeiffer]

- Write a brief purpose statement
 - Consider the obstacles that your readers face
 - Determine technical level of readers
 - Determine decision-making level of readers
 - Find out what decision-makers want
 - Collect and document information carefully
 - Write an outline
 - Write your first draft quickly
 - Revise in stages
-

Scientific Writing – More Tips ...

- Check journal or conference guidelines/format...
 - LaTeX macro?
 - Equations are treated as sentences (punctuation)
 - Use descriptive (standalone) captions
 - **SPELLCHECK!!!!!!!!!!!!!!**
 - K.I.S.S. Principle
-

Scientific Writing – Harvard Resources



The screenshot shows a web browser window displaying the Harvard University website. The URL in the address bar is <https://gsas.harvard.edu/student-life/harvard-resources/center-writing-and-communicating-ideas>. The page features the Harvard University logo and the text "HARVARD UNIVERSITY The Graduate School of Arts and Sciences". A navigation menu includes links for NEWS, EVENTS, ALUMNI ASSOCIATION, MAKE A GIFT, and CONTACT. Below this, there is a dropdown menu for "INFO FOR" currently set to "- Choose -". A secondary navigation bar contains links for PROGRAMS OF STUDY, ADMISSIONS, FINANCIAL SUPPORT, ACADEMICS, STUDENT LIFE (which is highlighted), DIVERSITY, and ABOUT, along with a search icon. The main content area has a breadcrumb trail "STUDENT LIFE > RESOURCES >" and a large heading "The Center for Writing and Communicating Ideas". The text below the heading describes the center's services: "The Center for Writing and Communicating Ideas offers individual consultations, peer workshops, and other programming to support registered GSAS students at all stages of their careers. Tutoring support is offered to all GSAS students in any discipline who seek to improve their academic papers, dissertations, and presentations. Overall, the CWCI helps GSAS students to heighten the impact of their research by fostering and refining their written and oral communication skills." To the right of this text is a "CONTACT" section featuring a photo of Suzanne Smith, her title "Director of the Center for Writing and Communicating Ideas", and a "Send Email" link. At the bottom of the page, there is a "SHARE THIS" section with icons for Facebook, Twitter, and Email.

https://gsas.harvard.edu/student-life/harvard-resources/center-writing-and-communicating-ideas

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The Center for Writing and Communicating Ideas offers individual consultations, peer workshops, and other programming to support registered GSAS students at all stages of their careers. Tutoring support is offered to all GSAS students in any discipline who seek to improve their academic papers, dissertations, and presentations. Overall, the CWCI helps GSAS students to heighten the impact of their research by fostering and refining their written and oral communication skills.

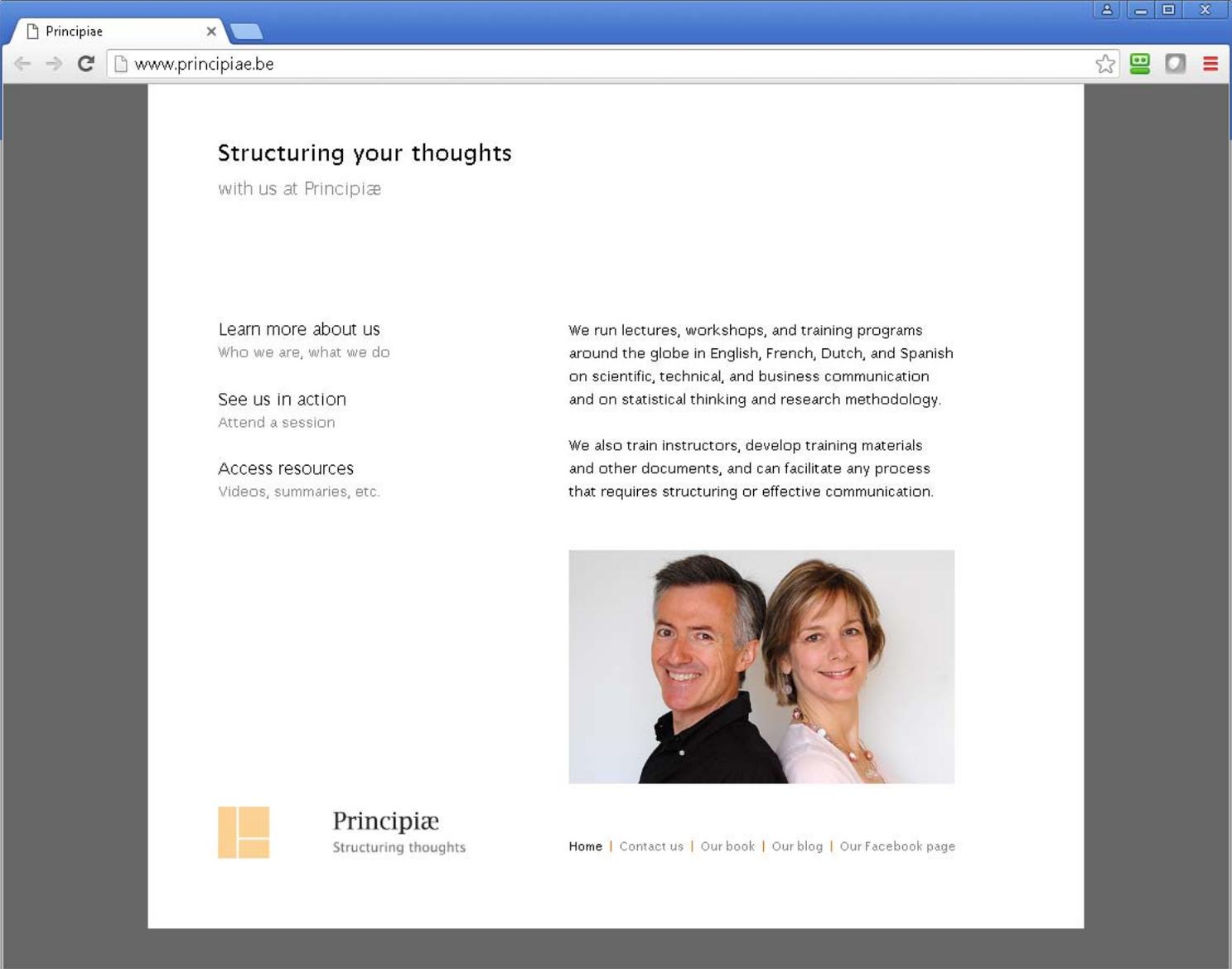
CONTACT

 **Suzanne Smith**
Director of the Center for Writing and Communicating Ideas
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Scientific Writing – Harvard Resources



The image shows a screenshot of a web browser displaying the website for Principia. The browser's address bar shows the URL www.principiae.be. The page content is as follows:

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Scientific Writing – Harvard Resources

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Creating Effective Presentation Slides

Community

Jean-Luc Doumont
Wednesday, February 5, 2014 -
3:30pm to 5:30pm
Maxwell Dworkin G115, 33 Oxford Street, Cambridge, MA

5 FEB

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Jean-Luc Doumont Lecture: The three laws of communication

Jean-Luc Doumont Lecture: The three laws of communication

Career Development
Student Events

Dr. Jean-Luc Doumont
Wednesday, January 21, 2015 -
3:00pm to 5:30pm
MD G115

21 JAN

Oral Presentations - Planning

- Determine audience background (specialized vs. general talk)
 - What is the audience expectation?
 - What are the major points?
 - What is the time frame?
 - You should have prepared multiple versions of your research presentation
 - 1-2 min (social event)
 - 3-5 min (poster presentation)
 - 15-20 min (conference talk)
 - 30 min (consortium meeting)
 - 45 min (interview)
-

Oral Presentations – AMSTAT – I

- Make sure the audience walks away understanding the five things any listener to a presentation really cares about:
 - What is the problem and why?
 - What has been done about it?
 - What is the presenter doing (or has done) about it?
 - What additional value does the presenter's approach provide?
 - Where do we go from here?

 - Carefully budget your time, especially for short (e.g., 15 minute) presentations.

 - Allow time to describe the problem clearly enough for the audience to appreciate the value of your contribution. This usually will take more than 30 seconds.
-

Oral Presentations – AMSTAT – II

- Leave enough time to present your own contribution clearly. This almost never will require all of the allotted time.
 - Put your material in a context that the audience can relate to. It's a good idea to aim your presentation to an audience of colleagues who are not familiar with your research area. Your objective is to communicate an appreciation of the importance of your work, not just to lay the results out.
 - Give references and a way to contact you so those interested in the theoretical details can follow up.
-

Oral Presentations – Rehearsal

- Rehearsal – early and often!
 - Listen to feedback from colleagues
 - Identify weak spots – and strengthen
 - Anticipate questions
 - Have backup materials
-

Oral Presentations – At the Podium...

[J. Radel, 1999]

- Take several deep breaths as you are being introduced (but don't sigh!). Visualize your rehearsed opening statement; don't improvise at the last moment.
 - State your objectives at start of your talk, then restate them again at the end of the talk. In between, discuss how your material relates to these objectives.
 - Unless you intentionally have had experience as a stand-up comic, avoid making jokes. The results can be disappointing, and may suggest an unprofessional attitude.
 - Choose a natural, moderate rate of speech and use automatic gestures.
 - Monitor your behavior, and avoid habitual behaviors (pacing, fumbling change in pocket, twirling hair).
 - Laser pointers are wonderful pointing devices, but remember not to point them at the audience. They are best used by flashing the pointer on and off, so that the place you are indicating is illuminated briefly. Don't swirl the laser around and around one place on the projection screen, or sweep it from place to place across the screen. This is very distracting for the audience, and they will end up watching the pointer and not listening to what you are saying.
 - Enthusiasm for your topic is contagious, but don't overdo it - you'll alienate the audience.
 - Converse with your audience. Involve them in the process of the presentation by posing questions and making eye contact.
 - Keep an eye on your time, and don't run over your limit. **Ever.**
 - Be prepared for interruptions (late arrivals, burned out projector bulbs, fire drills, etc.).
-

Oral Presentations – At the Podium...

[J. Radel, 1999]

- If you must turn down the room lights, don't turn them off entirely. Don't leave the lights down any longer than necessary - remember to turn them back up! Of course, the snores from the sleeping audience may remind you to turn the lights back on if you've forgotten.
 - Don't apologize for any aspect of your presentation. This should be your very best effort; if you have to apologize, you haven't done your job properly.
 - Don't criticize aspects of the trip, city, facilities, etc. during your talk. This is another way to alienate your audience quickly. For instance, they may or may not have chosen to live in this horrible climate, but it isn't your place to remind them how horrible it is. Remember that you are a guest.
 - Strive to have a prepared and memorable summary. If nothing else, the take home message is what the audience will remember after you leave.
 - When you reach the summary and are about to finish, resist the temptation to add a few last impromptu words. They will be unpracticed, and will be the last thing many of your audience will hear you say. End your talk with the insightful, firm summary statement you have prepared.
 - Don't be afraid to give yourself credit for your own work, but do remember to give others credit where due. I prefer to do this early, other may prefer doing it later in the talk. If planned for later in the talk, don't forget to acknowledge these people's efforts, even if you have to skip a statement or two to remain within your time frame. The best friend of one of these contributors may be in your audience! If you include slides borrowed from other people, or slides which include other people's data or figures, always give credit to these people right on that slide. This shows a professional attitude, and (better yet) can save you many words of explanation.
-

Oral Presentations – Questions

[J. Radel, 1999]

- **Always repeat each question so the entire audience knows what you've been asked.**
 - **Before you answer, take a moment to reflect on the question. By not rushing to give an answer, you show a degree of respect for the questioner, and you give yourself time to be sure you are answering the question that actually was asked. If you are unsure, restate the question or ask for a clarification.**
 - **Above all, wait for the questioner to finish asking the question before you begin your answer! The only exception is when it becomes necessary to break in on a vague, rambling question; this is your show, and you have only a limited time to make your presentation. It is essential, however, that you break in tactfully. Say something like "So, are you asking?" This will focus the question and give you a place to begin an answer. Remember that your ability to interact with an audience also is being evaluated.**
 - **If a question is asked during the talk, and it will clarify an ambiguity, answer it immediately.**
 - **Postpone questions aimed at resolving specific problems (or arcane knowledge) until the end of the talk, or private discussion. This is particularly important if the answer will distract either you or the audience away from the flow of your presentation.**
 - **Avoid prolonged discussions with one person, extended answers, and especially arguments.**
-

Oral Presentations – Common Problems

- Timing
 - Volume (low or monotone)
 - Speak loudly, clearly, and with inflection
 - Pacing, speed
 - Pause frequently
 - Gestures and posture
 - Avoid scanning eyes, moving without purpose, playing with pointer, etc.
 - Verbal crutches
 - Train yourself to avoid “uh”, “like”, “and then”
 - Reading from notes and/or slides
-