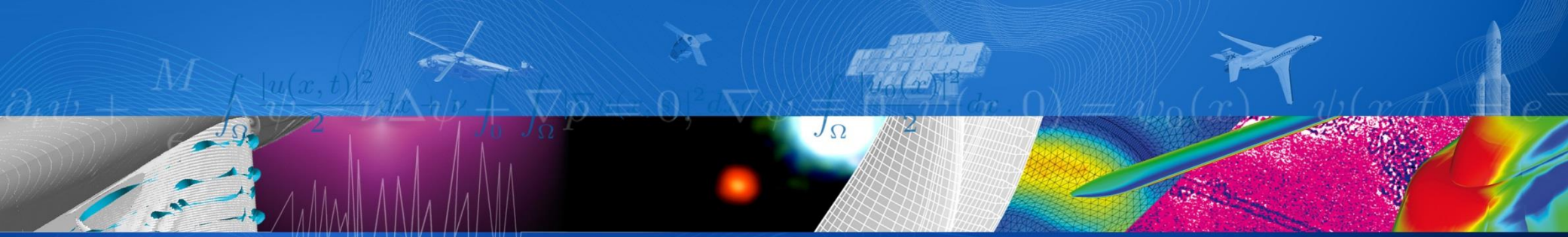


Experimental approach & Ethics

Catherine Tessier

Winter School ROBOTICA PRINCIPIA

January 21st, 2019

ONERA

THE FRENCH AEROSPACE LAB

Law, deontology, and Research Integrity

Law

For doctoral schools, doctoral candidates and their supervisors *(please read it!)*

Arrêté du 25 mai 2016 - link

fixant le cadre national de la formation et les modalités conduisant à la délivrance du diplôme national de doctorat

Especially - Art3: All doctoral candidates must have taken a course on Research Ethics and Research Integrity

Deontology

The French Charter for Research Integrity (2015) – see here

Theses charters (≥ 2016)

Research Integrity

The European Code of Conduct for Research Integrity (2017) - link

French Charter for Research Integrity

Seven chapters

Compliance with legislative and regulatory requirements

Reliability of research work

Appropriate methods, replication of work, data must be kept, objective and honest results, correct citations

Communication

Publications, authors

Responsibility in collective work

Rules of good practice, respectful work relationships, misconducts

Impartiality and independence in assessment and expertise

Conflicts of interest, confidentiality, refrain from using data provided during evaluation

Collaborative work and plurality of activities

Partnership agreements, rules for plurality of activities

Training

Learning research integrity rules is part of the researcher's skills

The European Code of Conduct for Research Integrity (revised edition 2017)

Good Research Practices

- Research Environment
- Training, Supervision and Mentoring
- Research Procedures
- Safeguards
- Data Practices and Management
- Collaborative Working
- Publication and Dissemination
- Reviewing, Evaluating and Editing

Violations of Research Integrity

- Research Misconduct and other Unacceptable Practices
- Dealing with Violations and Allegations of Misconduct

What is research integrity?

Deals with the way to do research and to publish results

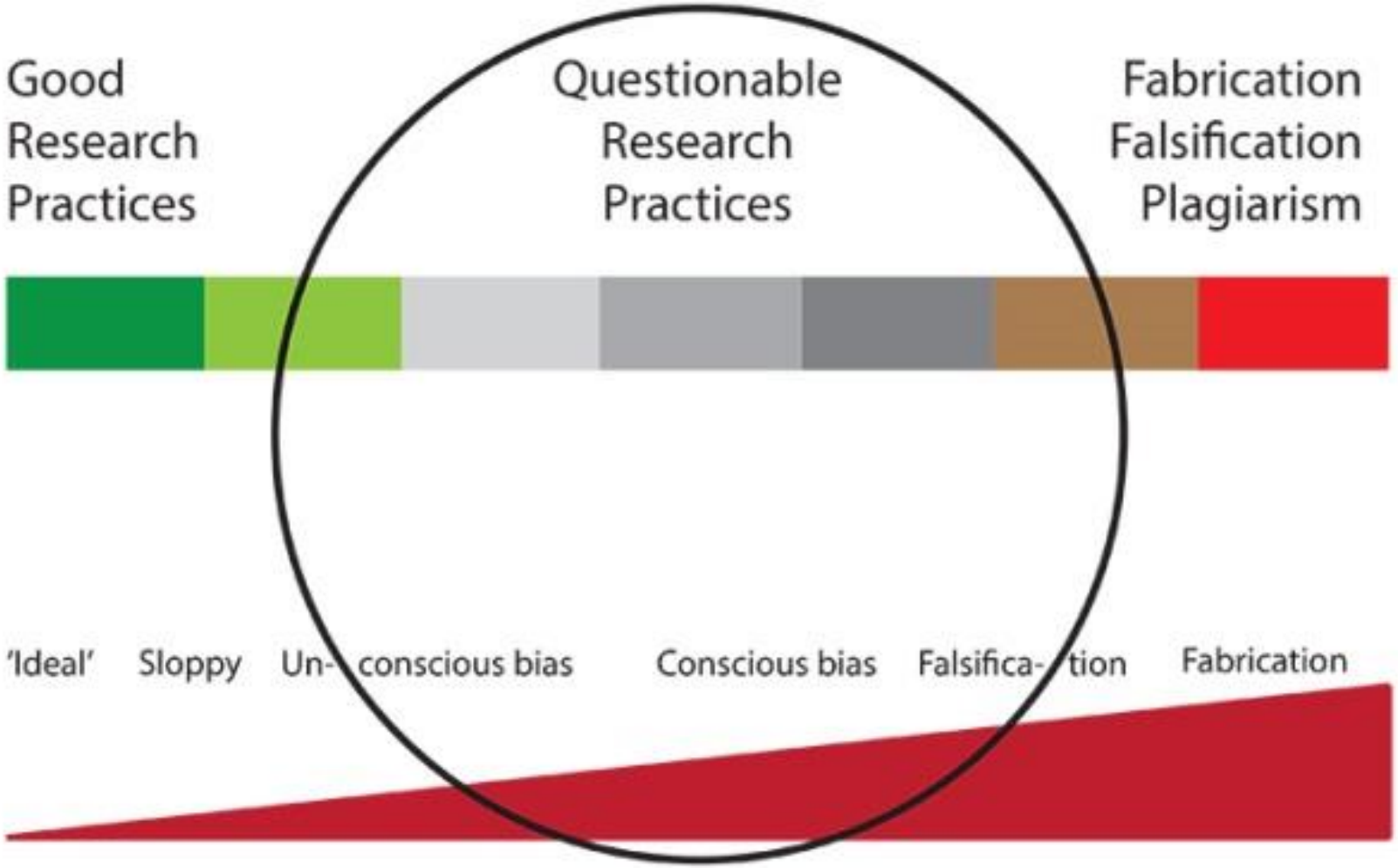
- Researcher's integrity and honesty
- Best practices / questionable practices / frauds

→ "*Research integrity is not debatable, it is compulsory*"

Rapport P. Corvol (juin 2016) - link

Focus in this course:

- Experiments with participants
- Publication ethics
- Questionable practices and frauds



VIB - Research misconduct
The grey area of Questionable Research Practices. Sept. 2013

Best practices
The lab notebook

- Traceability of work

"serves to bring proof of research process"

to meet "international quality standards"

- Proof for the date of invention (legal tool)

"proof of the identity of the inventor"

"can be used in a court of law, particularly to settle disputes over intellectual property or to justify prior ownership"

→ National laboratory notebook – link

How would you design an experiment involving your robot
and participants?

Who is involved?

- The investigator
  → cannot be you!
  → must be a permanent researcher in the lab

- The participants
  → who are they?
  → how are they recruited?
  → what are the inclusion / exclusion criteria?

Information given to participants

- Purpose of the experiment (really?)
- Procedure of the experiment
- Benefits and risks for themselves

- Important criteria
  1. freedom: the participant enrolls willingly, i.e., with no constraint nor pressure
  2. justice (or equity): all participants are considered in the same way
  3. benevolence (or no-nuisance): participants are treated with respect and kindness
  4. privacy and confidentiality

Nuremberg Code, 1947 – link
Declaration of Helsinki, 1964, 1975, 1983, 1989 - link

→ Informed consent of the participant

- Information about experiment
- Respect of criteria, esp.:
  - Participant may leave the experiment at any time with no consequences
  - Explain how data will be pseudonymized, processed, kept and used
- Incidental findings
- Contact people

Consent of participant

- Should be kept in secure place, apart from collected data

Data

Personal data: *any information relating to an identified or identifiable natural person ('data subject'); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person;* (Art. 4 General Data Protection Regulation - GDPR)

- Do you plan to collect personal data?

e.g., voice, picture, video, physiological measurements, some questionnaire answers, etc.

→ special consent (e.g., pictures, videos)

→ describe data protection process

→ inform and get review of the Data Protection Officer (DPO) of your lab

Last but not least:

Experiment MUST be validated by an ethical committee

- BEFORE experiment begins
- File submitted by the investigator (not you)

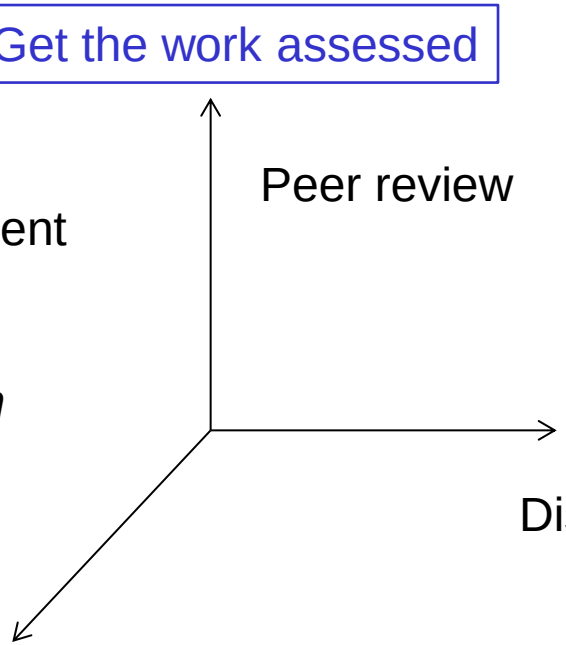
- To be sure that experiment meets all (legal, ethical) requirements
- To be able to publish
- To be able to get funding (e.g., from Europe)

- Ethical Committees
  - CER (Comité d'éthique pour la recherche) : Universities
  - Institutional committees (e.g., Inria's COERLE – link)

Publication ethics

Why do you publish?

Publication ethics



To be

- known
- cited (increase one's "bibliometric indices")
- hired
- to get a promotion

→ Purposes may be difficult to combine

Publication ethics – What is an author?

ICMJE (International Committee of Medical Journal Editors) - *Defining the Role of Authors and Contributors* – link

→ See also Springer - link

The ICMJE recommends that authorship be based on the following 4 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.

3. Non-Author Contributors

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. Those whose contributions do not justify authorship may be acknowledged individually or together as a group under a single heading (e.g. "Clinical Investigators" or "Participating Investigators"), and their contributions should be specified (e.g., "served as scientific advisors," "critically reviewed the study proposal," "collected data," "provided and cared for study patients", "participated in writing or technical editing of the manuscript").

Publication ethics – What is an author?

Elsevier – link

- **Authorship of the paper:** Authorship should be limited to those who have made a significant contribution to the conception, design, execution, or interpretation of the reported study. Transparency about the contributions of authors is encouraged, for example in the form of a CRediT author statement.

IEEE – link

Definition of Authorship

Authors and authorship defined: Who is an author?

Who should be listed as an author on your scientific article? IEEE's definition of authorship will help you answer that question and clarify each author's responsibilities.

IEEE considers individuals who meet **all** of the following criteria to be authors:

1. Made a significant intellectual contribution to the theoretical development, system or experimental design, prototype development, and/or the analysis and interpretation of data associated with the work contained in the article;
2. Contributed to drafting the article or reviewing and/or revising it for intellectual content;
3. Approved the final version of the article as accepted for publication, including references.

Contributors who do not meet all of the above criteria may be included in the Acknowledgment section of the article. Omitting an author who contributed to your article or including a person who did not fulfill all of the above requirements is considered a breach of publishing ethics.

Source: IEEE Publication Services and Products Board Operations Manual, Section 8.2.1.A.1.

Publication ethics – Misconducts

Who is going to be a co-author of the paper should be discussed BEFORE writing!

Misconducts

T. Albert, E. Wagner. *How to handle authorship disputes: a guide for new researchers* – The COPE report 2003 – lien

- "put" (or put pressure on sb to make them "put") a *gift author* (who might not be aware)
  - → manager, renown researcher, financer, friend, colleague…
  - → to please, to thank (??!), to expect a return of favor
- "omit" an author who is really an author - *ghost author*
- omit to thank people that should be acknowledged

N.B.: co-authors are jointly responsible for the work

Je publie, quels sont mes droits ? Brochure Direction de l'information scientifique et technique, CNRS – lien

Questionable practices and frauds

Consider your research practices

Questionable Research Practices - QRPs

For example - see

From the following article:
Scientists behaving badly
Brian C. Martinson, Melissa S. Anderson and Raymond de Vries
Nature **435**, 737-738(9 June 2005)
doi:10.1038/435737a

- Dropping observations or data from analyses
- Failing to present data that contradict one's own previous research
- Using inappropriate statistical methods
- Changing the design, methodology or results in response to pressure (e.g., from a funding source)
- Inadequate record keeping related to research projects (e.g., data)
- Using another's ideas without obtaining permission or giving due credit
- Publication *salami slicing*
- Biased selection of citations

and many others…

Conflicts of interest

e.g., in projects and papers reviews

Frauds: fabrication and falsification of data and results (1/2)

Example: Olivier Voinnet

Thanks to M. Leduc (COMETS CNRS)

Regarding the *PLoS Pathogens* 2013 9:e1003435 paper, OV admitted that Figure 6 was fabricated and that this was for him the 'worst case.' This faulty figure was retrieved from a Master's student report and was reused in the paper in response to a reviewer's comment, apparently without noticing that the student had fabricated these panels. OV was able to show, in the original lab notebooks, that experiments related to the fabricated Figure 6 had indeed been performed and that a fully authentic figure could have been prepared at the time of publication. OV admitted responsibility for not having personally overseen preparation of the figure, neither for the Master's report nor for the final submission to *PLoS Pathogens*. OV added that the co-corresponding and last author on the paper had no responsibility for the figure in question.

Report of the ETH Commission of Inquiry set up to clarify allegations against Prof. Olivier Voinnet of ETH Zurich. July 2015 – lien

Frauds: fabrication and falsification of data and results (2/2)

Fabrication and falsification are extremely serious as:

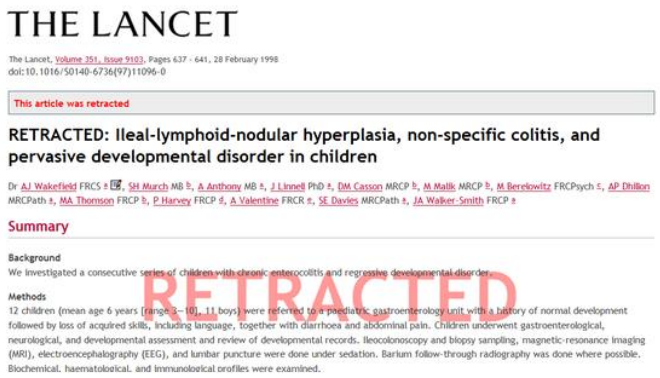
- They are major obstacles to scientific advance
(how can knowledge increase from false results?)

- They can have far-reaching consequences if results are used
(heath, environment, industry, economy, etc.)

Réflexion éthique sur le plagiat dans la recherche scientifique – COMETS CNRS Avis n°2017-24, juin 2017 – lien

But in France: not criminal cases in general
Disciplinary measures within institution (?)

USA: penalties (fine and even jail)



THE LANCET

The Lancet, Volume 351, Issue 9103, Pages 637 - 641, 28 February 1998
doi:10.1016/S0140-6736(97)11096-0

This article was retracted

RETRACTED: Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children

Dr AJ Wakefield FRCS a, SH Murch MB b, A Anthony MB a, J Linnell PhD a, DM Casson MRCP b, M Malik MRCP b, M Berelowitz FRCPsych c, AP Dhillon MRCPath a, MA Thomson FRCP b, P Harvey FRCP d, A Valentine FRCR e, SE Davies MRCPath a, JA Walker-Smith FRCP a

Summary

Background
We investigated a consecutive series of children with chronic enterocolitis and regressive developmental disorder.

Methods
12 children (mean age 6 years [range 3–10], 11 boys) were referred to a paediatric gastroenterology unit with a history of normal development followed by loss of acquired skills, including language, together with diarrhoea and abdominal pain. Children underwent gastroenterological, neurological, and developmental assessment and review of developmental records. Ileocolonoscopy and biopsy sampling, magnetic-resonance imaging (MRI), electroencephalography (EEG), and lumbar puncture were done under sedation. Barium follow-through radiography was done where possible. Biochemical, haematological, and immunological profiles were examined.

RETRACTED

Rétrospectivement, cet épisode peut donc se résumer comme la **publication dans des conditions problématiques d'un travail scientifique frauduleux**, réalisé pour servir des intérêts financiers, et qui, du fait d'un grand écho médiatique, va être associé à une perte de confiance dans le vaccin, une baisse de la couverture vaccinale et une résurgence d'une maladie infectieuse ; et cela alors qu'aucun travail scientifique n'était venu corroborer les résultats de l'étude initiale.

Frauds: plagiarism

See CNRS COMETS opinion on plagiarism - link

"Plagiarism in scientific research mainly consists in misappropriating somebody else's texts or results."


comets

CNRS Ethics Committee

OPINION no. 2017-34

ETHICAL REFLECTION ON PLAGIARISM IN SCIENTIFIC RESEARCH

Opinion no. 2017-34 approved at the COMETS plenary session of 27 June 2017

- Plagiarism of published texts

e.g., no citation, translation, paraphrase…

- Particular case: self-plagiarism

= reuse own work of authorship with no citation

Caution: once published, if copyrights have been transferred, "your" paper, figure, etc., is no longer yours! Authorization of (e.g., editor) is required to reuse it.

- Misappropriation of results and ideas

= theft

E.g., ideas taken from conferences, reviewed papers, discussions in the corridor, etc.

→ *Write down your good ideas in your lab notebook before discussing them at the coffee machine ☺*

To sum up

- Read the documents and advise your supervisors to read them too ☺
- Speak with your colleagues within your team
- Question your experiment projects
- Question your publication projects
- Question your research
- Attend a whole course on Research Ethics and Integrity!