Student researchers and publication ethics – TL;DR LOL ;)
• Research integrity and publication ethics
• UoM’s approach to research integrity
• UoM’s approach with student researchers
• Our observations on interactions with student researchers and their interactions with research integrity and publication ethics
• TL;DR
  – Short for ‘too long; didn’t read’

• Perception that students need information presented in short, snappy bites and that short attention spans means that details are not properly considered

• Not the case in our experience

• Isn’t short snappy bites good for everyone anyway...?
What is research? Why do we do it?

• “the systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions’ – OED online

• it is iterative and accretionary

• it builds on itself – one step at a time – it is rarely revolutionary

• it is a deeply human endeavour
• ...are broad and unpredictable

• no guarantee what the impact will be or when it will impact

http://jeps.efpsa.org/blog/2012/06/20/maximizing-research-impact/
• Virology

• Impact factor = 3.249

• Jian Zhou et al.

• Expression of Vaccinia

Recombinant HPV 16 L1 and L2 ORF Proteins in Epithelial Cell is Sufficient for Assembly of HPV Virion-like Particles

INTRODUCTION
Infection of the human cervix with human papillomavirus (HPV) types 16 or 18 is strongly associated with cervical cancer (Durst et al., 1982; Fuchse et al., 1983). Unlike other HPV genotypes (Kreider et al., 1987), HPV16 and 18 have not been propagated in vitro and intact virions have not been seen in naturally infected tissue. HPV16 late gene proteins L1 and L2 have been produced by recombinant DNA technology in prokaryotic (Dobber and Balkam, 1987; Banks et al., 1988; Shute et al., 1989) or eukaryotic (Browne et al., 1988; Zhou et al., 1990) expression systems and are believed to be the capsid proteins. However, the components of the HPV16 virion and the mechanism of virus particle assembly in the nucleus of the HPV-infected cell are essentially unknown, although the E4 protein has been thought to play a role in virion assembly (Dobber et al., 1986). We therefore examined the production of HPV-like particles in cells infected with recombinant vaccinia viruses simultaneously expressing combinations of the HPV16 E4, L1, and L2 genes. Production of virus-like particles by recombinant vaccinia virus was demonstrated by electron microscopy (EM), and the involvement of HPV protein confirmed by immunoblotting.

MATERIAL AND METHODS
Recombinant vaccinia viruses
The HPV16 L1 gene, from the second ATG (nt 6607), was amplified by polymerase chain reaction from pHPV16 (provided by Dr. Glisnarr), using the primers

1  To whom requests for reprints should be addressed.
• **Virology**

• **Impact factor = 3.249**

• Jian Zhou et al.

• **Expression of Vaccinia**

  *Recombinant HPV 16 L1 and L2 ORF Proteins in Epithelial Cell is Sufficient for Assembly of HPV Virion-like Particles*
Research Impact 2 – Where did WiFi come from?

• U.S. Patent 5,487,069

United States Patent

O’Sullivan et al.

Inventors: John D. O’Sullivan, Evanston; Graham R. Daniels, Wilmingt.; Terrence M. P. Percival, Lane Cove; Diethelm L. Oster, Penrith; John F. Deane, Eastwood; all of Australia

Assignee: Commonwealth Scientific and Industrial Research Organisation, Australia

Appl. No: 857,375
Filed: Nov. 23, 1993

Foreign Application Priority Data
Nov. 27, 1992 [AU] Australia

Field of Search

References Cited

U.S. PATENT DOCUMENTS
3,635,019 9/1971 Carter et al. 375/98
3,664,314 12/1972 Amend 375/98
3,888,767 12/1975 Perez et al. 375/98
3,962,953 3/1976 Freiburg 455/56.1, 54.1
3,919,076 9/1975 Perone et al. 375/30
3,983,780 9/1976 Schenck et al. 455/56.1

OTHER PUBLICATIONS

ABSTRACT

The present invention discloses a wireless LAN, a peer-to-peer wireless LAN, a wireless transceiver and a method of transmitting data, all of which are capable of operating at frequencies in excess of 10 GHz and in multipath transmission environments. This is achieved by a combination of techniques which enable adequate performance in the presence of multipath transmission paths where the reciprocal of the information bit rate of the transmission is short relative to the time delay differences between significant ones of the multipath transmission paths. In the LANs the mobile transceivers are each connected to, and powered by, a corresponding portable electronic device with computational ability.

72 Claims, 8 Drawing Sheets
Research Impact 2 –
Where did WiFi come from?

- WWII Radar
- Radio astronomy
- Cochlear implant

Credit: CSIRO
Credit: Edwtie


• 22 cites.
A bio-inspired swellable microneedle adhesive for mechanical interlocking with tissue

Seung Yun Yang¹,²,³, Eoin D. O'Ceirbhailí¹,²,³, Geoffroy C. Sisk⁴, Kyeng Min Park⁵, Woo Kyung Cho¹,³, Martin Villiger⁶, Brett E. Bourma³,⁶, Bohdan Porahac⁴ & Jeffrey M. Karp¹,²,³
• We don’t know when our research might have impact, so we have to do what we can now to make sure that our findings can be trusted.

• The list of things that we can do now are the principles of research integrity.

• Not only do they help support trust in research, they also help in the production of research that is excellent.

• Principles captured in many Code of Conduct for Research
  – Australian Code for the Responsible Conduct of Research
  – Singapore Statement
<table>
<thead>
<tr>
<th>Principle</th>
<th>Practice</th>
<th>Why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data and records</td>
<td>Maintained, retrievable, safe, ‘owned’</td>
<td>‘gold’ – reuse and sharing; insurance</td>
</tr>
<tr>
<td>Supervision of research trainees</td>
<td>Induct! Provide appropriate environment</td>
<td>the future of research; ‘vulnerable’</td>
</tr>
<tr>
<td>Publication and dissemination</td>
<td>‘Responsible’</td>
<td>track record; performance</td>
</tr>
<tr>
<td>Authorship</td>
<td>Must have met requirements; keep record of agreement</td>
<td>track record; recognition; performance</td>
</tr>
<tr>
<td>Peer Review</td>
<td>Participate ‘responsibly’</td>
<td>contribution to research</td>
</tr>
<tr>
<td>Conflict of Interest</td>
<td>Disclose and manage where appropriate</td>
<td>transparency and trust</td>
</tr>
<tr>
<td>Collaborations across institutions</td>
<td>Have agreements in place</td>
<td>prevent disputes; clarify responsibilities</td>
</tr>
<tr>
<td>Research misconduct</td>
<td>Have processes in place and respond to allegations</td>
<td>transparency and trust</td>
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</table>
Expectations of the general public

Expectations of the research community

Rules and regulations

Personal expectations (morals, ethics etc)

YOU ARE HERE
Research Integrity is an ‘ecosystem’

Research Integrity

Public

Universities and research organisations

Governments

Funding agencies

Publishers
Cultures of research integrity
• Most strong culture of research ethics and integrity display the following traits
  – Voice from the top
  – Training and education
  – Clear expectations
### 4 Key Areas of Response by OREI

<table>
<thead>
<tr>
<th>(i) Clarifying Expectations</th>
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Student researchers
• Student researchers vs research students
  – Do we treat this cohort primarily as students or as researchers?
  – Researchers first, students second

• In practice, this means that our expectations on students researchers are the same as they are on researchers

• Recognise that there is a power imbalance and so that for some students questioning or challenging their supervisors is a difficult thing to do

• How do we address this?
• One of the three things...

• Making sure that student researchers have a clear understanding of the principles of research integrity (that are hopefully captured in policy) lets them ask a question
  – ‘If the policy says this, why are we doing that?’

• Bottom-up or grass roots approach to culture change
Online research integrity training

• Implementing a commercially available product from Epigeum
• Covers the principles of research ethics and integrity, including publication ethics
• Broadly discipline specific streams that allow coverage of areas where there is a spectrum of accepted practice (authorship, data management)
• Will be a requirement for all commencing PhD students to complete in their first year (prior to confirmation)
• Subject offered as part of MSc degree
• Small group – optimally about 40 students (but has been up to 90)
• Subject developed by Associate Professor Laura Parry and Dr Kath Handasyde, Zoology
• Covers the principles of research integrity, including authorship, publication, peer review, conflict of interest
• Lecture followed by workshop
• Part of assessment is peer review of other students work; marks are given for the quality of the peer review that they undertake
Ad hoc workshops

- On publication and authorship (amongst others) to
  - Undergraduates in Microbiology and Immunology
  - Science faculty post-doc network
  - Plagiarism workshop in Paediatrics

- Important part of all of these approaches is the opportunity to discuss the principles and practice thinking about what they mean in each research context
Student researchers and publication ethics – Roles and responsibilities of supervisors and institutions
A role: Talk with your supervisee about publication ethics

- Survey of supervisors suggests that they are a key point of information about publication ethics
- Discipline differences?
- Implications for programmatic research degrees?
- What do the student researchers think?
Responsibilities of supervisors

According to the Australian Code:
Supervisors of research trainees should...

• Ensure training
• Mentor and provide support
• Ensure valid and accurate research
• Ensure appropriate attribution

• These appear intrinsic to research conduct
• How much training do supervisors require to fulfill these responsibilities?
• How do these match to incentives?
Roles and responsibilities for institutions – Three things

• Most strong culture of research ethics and integrity display the following traits
  – Voice from the top
  – Training and education
  – Clear expectations
## 4 key areas of response by OREI

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Policy review and remaking

• Shift from rules to principles
• Components covered:
  – The University code of conduct for research
  – Research integrity
  – Processes for the handling of allegations of research misconduct
  – Human research ethics
  – Animal ethics and welfare
  – Biorisk
Authorship is a complex ecosystem
Melbourne Authorship Policy

- Principles-based policy [go.unimelb.edu.au/2asn](go.unimelb.edu.au/2asn)

- Principles: *Honesty, fairness, consistency, transparency and generosity within requirements*

- Significant intellectual or scholarly contribution and accountability that contribution

- Talk early and often

- Agree on authorship

- Describe contributions

- Researchers must recognise contributions of student researchers
The ICMJE recommends that authorship be based on the following 4 criteria:

1. Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
2. Drafting the work or revising it critically for important intellectual content; AND
3. Final approval of the version to be published; AND
4. 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.

- *Can anyone be an author according to these criteria?*
- *How can student researchers fulfill these?*
• The attribution of authorship criteria described by ICMJE are used widely and affect key documents such as codes of conduct.

• However, they are not used by many publishers including *Nature*, *Science*, *PNAS*.

• The criteria doesn’t work when used by certain journals.
PLOS One - 26% of articles fit ICMJE criteria for authorship
The policy

• Principles
  – Honesty and accuracy
  – The fulfillment of research and an obligation

• Communicate research findings

• Acknowledge and cite the work of others and your own

• Disclose funding and conflicts of interest

• Communicate research broadly

• The University supports making research publically available
Our observations of student researchers and publication ethics
Summary of observations

• Everyone is over 18
  – Undergraduate 3rd Year student researchers already have a sophisticated understanding of publication ethics
  – Engine-room of research

• Challenges in discussing publication ethics with student researchers
  – Access and scale
  – Appropriate material
  – Linked to discussions with supervisors
  – Discipline conventions are sometimes unhelpful

• Research misconduct is committed by student researchers
  – Culpability
• Research integrity - publication ethics - makes research trustworthy and excellent

• Student researchers exist in an imbalanced power relationship, are learning how to research, but are researchers
Thank you!