A Career in Science Writing and Communication

Jessica Thomas
Editor, physics.aps.org

University of Illinois, U-C – Physics Career Seminar February 7, 2014

Outline

What I Do

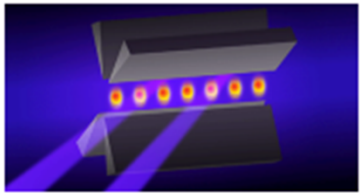
How I Got Here

Thoughts on this career path (compared to research)

What I Do

Run a web site (physics.aps.org) that promotes research in the APS journals
(*Physical Review Letters*, *Physical Review*)

Some freelance writing



Synopsis: A Quantum Machine Made of Ions
February 6, 2014
Experiments with trapped ions could prove that a quantum machine can churn through a calculation faster than a classical one.

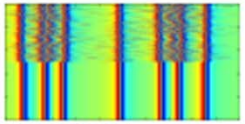
Viewpoints

Encouraging Signs on the Path to Fusion
February 5, 2014
Steven J. Rose

By adopting a new strategy toward laser fusion, researchers at the National Ignition Facility have produced the highest energy output to date.

Thermal Cloaks Get Hot
February 3, 2014
Andrea Alù

Two experiments show that metamaterials can shape the thermal distribution around an object, eliminating its disturbance of the thermal flux.



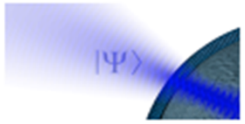
Taking the Pulse
January 29, 2014
Carlo R. Laing

A new mathematical model allows the description of ensembles of biological oscillators coupled by short pulses, like neural networks.

Synopses

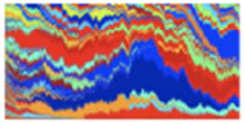
To Exploit or Explore, That is the Question
February 5, 2014

A compromise between exploitation of known resources and exploration of new ones may be the best strategy for optimizing growth in a broad range of real-world situations.



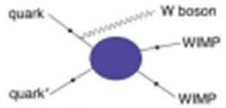
Clearer Quantum Vision
February 4, 2014

The use of quantum states of light can enhance the resolution of bioimaging techniques.



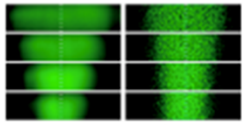
Fighting for Attention
January 30, 2014

Competition for attention among users can bring social networks close to the critical point of a phase transition.



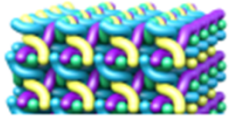
Looking for the Invisible at Colliders

Focus



Turbulence Can't Stir Plankton
January 31, 2014

Turbulence causes certain swimming microorganisms to segregate into clusters, rather than spreading out evenly, according to experiments and simulations.



Protein Physics of Pruney Skin
January 24, 2014

A thermodynamic model explains how the unique packing of protein filaments in skin allows it to absorb water and expand.

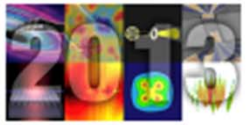
More Focus

First Spectrum of Ball Lightning
January 17, 2014

Bleaching Cleans Up Cell Images
January 10, 2014

View All Focus »

Notes from the Editors



Highlights of the Year
December 30, 2013

Read More About

- Atomic and Molecular Physics
- Biological Physics
- Energy Research
- Fluid Dynamics
- Geophysics
- Interdisciplinary Physics
- Metamaterials
- Nonlinear Dynamics

View All Subjects

Keep Up With Physics

American Physical Society Sites

APS Home

Journals

PhysicsCentral

Physics Frontline

Intended Audience

Physics community

Students

Science writers/journalists*

Scientists in other fields

*Weekly tip sheet to journalists provides simpler summaries of what we cover in Physics.

physics.aps.org: Running a weekly web magazine

- Find new results worth covering
- Decide how best to cover new results (news story, expert commentary, editor summary)
- Find experts to write commentaries/edit their articles for readability
- Write summaries about papers/edit summaries from editors
- Maintain steady pipeline of content
- Manage staff of editors, freelance writers and illustrators
- Coordinate with authors, press officers
- Social media
- Attend conferences

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Looking for Exciting Results

What *Physics* Looks For

- Solves a long standing problem
- Advances the field/opens new questions
- Intrinsically interesting
- Applications/physics you can relate to
- Multidisciplinary
- Technically sound (to the best of our knowledge)
- A clear message that can be explained to a broad audience
- Good story

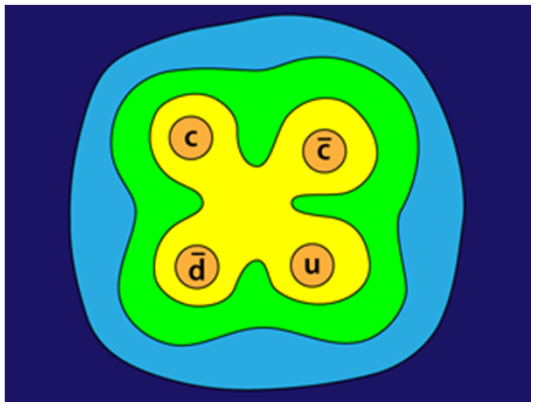
Some Numbers

PRL publishes 70 papers/week

Physical Review publishes ~ 200-250/week

Observation of a Charged Charmoniumlike Structure in $e^+e^- \to \pi^+\pi^- J/\psi$ at $\sqrt{s} = 4.26$ GeV

New Particle Hints at Four-Quark Matter



Tips

- Journal editors
- Author summaries
- Awareness from conferences, reading

Editing Commentary (Viewpoint) Articles

What we ask the writer to do:

"Explain new research result to the non-expert (students, science communicators, physicists/ scientists who work in other fields.) Why is it exciting for the field?"

Viewpoint: Encouraging Signs on the Path to Fusion

Steven J. Rose, *Blackett Laboratory, Department of Physics, Imperial College London, London SW7 2AZ, United Kingdom*

Published February 5, 2014 | Physics **7**, 13 (2014) | DOI: 10.1103/Physics.7.13

By adopting a new strategy toward laser fusion, researchers at the National Ignition Facility have produced the highest energy output to date.

For four years, researchers at the National Ignition Facility (NIF) have worked toward an ambitious goal: using powerful lasers to ignite fusion in a tiny target of nuclear fuel. If the fusion reaction releases more energy than the lasers provide—corresponding to a "gain" of greater than 1—NIF could have the makings of a new energy source. But so far, NIF hasn't been able to pass this gain threshold. And because experiments haven't matched up with the predictions of simulations, it has been difficult to figure out what to change. Now, researchers (Park *et al.*) at the Lawrence Livermore National Laboratory, California, where NIF is located, report in *Physical Review Letters* the first laser ignition experiment that appears to be behaving according to the predictions of current models [1]. The researchers used a different laser pulse shape to heat the target, producing the highest yield of neutrons—and therefore the largest energy output—seen to date. Their result is a major achievement because it gives hope NIF will ultimately find a path to achieving gain greater than 1.

The NIF experiment consists of a giant laser that delivers a rapid (a few nanoseconds) pulse of about 2 megajoules (MJ) of energy to a spherical target of nuclear fuel (typically deuterium and tritium) the size of a pea (Fig. 1, left). Since the facility began operating in 2009, it has been principally devoted to producing thermonuclear burn and energy gain using a technique called inertial confinement fusion (ICF). The idea is to use the laser to rapidly heat the spherical target. As the outside of the target expands, the fuel is compressed and heated, which drives a fusion reaction generating fast alpha particles and neutrons.

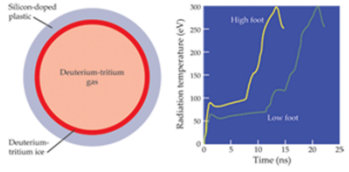
High-Adiabat High-Foot Inertial Confinement Fusion Implosion Experiments on the National Ignition Facility

H.-S. Park, O. A. Hurricane, D. A. Callahan, D. T. Casey, E. L. Dewald, T. R. Dittrich, T. Döppner, D. E. Hinkel, L. F. Berzak Hopkins, S. Le Pape, T. Ma, P. K. Patel, B. A. Remington, H. F. Robey, J. D. Salmonson, and J. L. Kline

Phys. Rev. Lett. 112, 055001 (2014)

Published February 5, 2014 | PDF (free)

+Enlarge image



APS/Joan Tycko, adapted from Ref. [10]

Common pitfalls

#1 Not stating the main message in a simple (direct) way.

#2 Too much background information.

#3 Forget to say what the authors did.

#4 Dense language, too much passive voice.

#5 Include info that only a specialist would consider important.

Why is it hard to write about research?

- Physics (and science in general) is exploratory and messy

  Great findings are often made by accident.
  You are rarely the first to do anything.
  Hard to wrap up in a neat bow.

- You know a lot, you care a lot.

- Physics is really specialized: We get lazy and use short-hand for concepts, rely on acronyms.

- Scientists want to be precise, often at the expense of clarity.

A manifesto for the simple scribe – my 25 commandments for journalists

Tim Radford, former science editor, Guardian

#9 “if an issue is tangled like a plate of spaghetti, then regard your story as just one strand of spaghetti, carefully drawn from the whole.

Ideally with the oil, garlic and tomato sauce adhering to it.

The reader knows life is complicated, but is grateful to have at least one strand explained clearly.”

Writing Summaries/News Stories

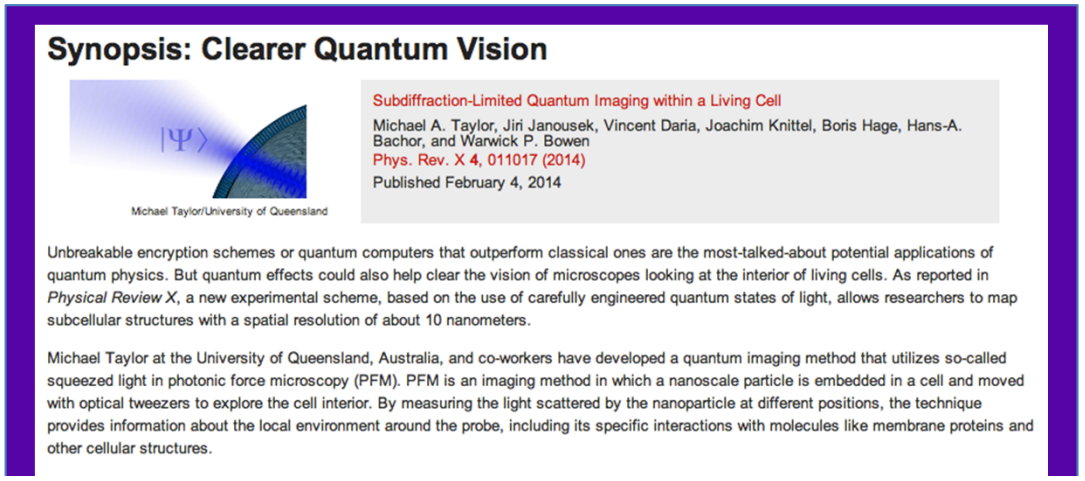
Questions I ask myself:

- Why do researchers care about this?
- Why would a non-specialist care about this?
- What did the authors do?

  Can I draw the experiment or how they set up their simulation?

  What did they measure or calculate?

  How is it new compared to previous work?
- What terminology do I have to explain?



Synopsis: Clearer Quantum Vision

Michael Taylor/University of Queensland

Subdiffraction-Limited Quantum Imaging within a Living Cell

Michael A. Taylor, Jiri Janousek, Vincent Daria, Joachim Knittel, Boris Hage, Hans-A. Bachor, and Warwick P. Bowen

Phys. Rev. X 4, 011017 (2014)

Published February 4, 2014

Unbreakable encryption schemes or quantum computers that outperform classical ones are the most-talked-about potential applications of quantum physics. But quantum effects could also help clear the vision of microscopes looking at the interior of living cells. As reported in *Physical Review X*, a new experimental scheme, based on the use of carefully engineered quantum states of light, allows researchers to map subcellular structures with a spatial resolution of about 10 nanometers.

Michael Taylor at the University of Queensland, Australia, and co-workers have developed a quantum imaging method that utilizes so-called squeezed light in photonic force microscopy (PFM). PFM is an imaging method in which a nanoscale particle is embedded in a cell and moved with optical tweezers to explore the cell interior. By measuring the light scattered by the nanoparticle at different positions, the technique provides information about the local environment around the probe, including its specific interactions with molecules like membrane proteins and other cellular structures.

After Reading 2000 Papers, a Wish List from an Editor

Build the paper around the figures. Do the figures tell a story?

Keep the introduction concise: Get to the point.

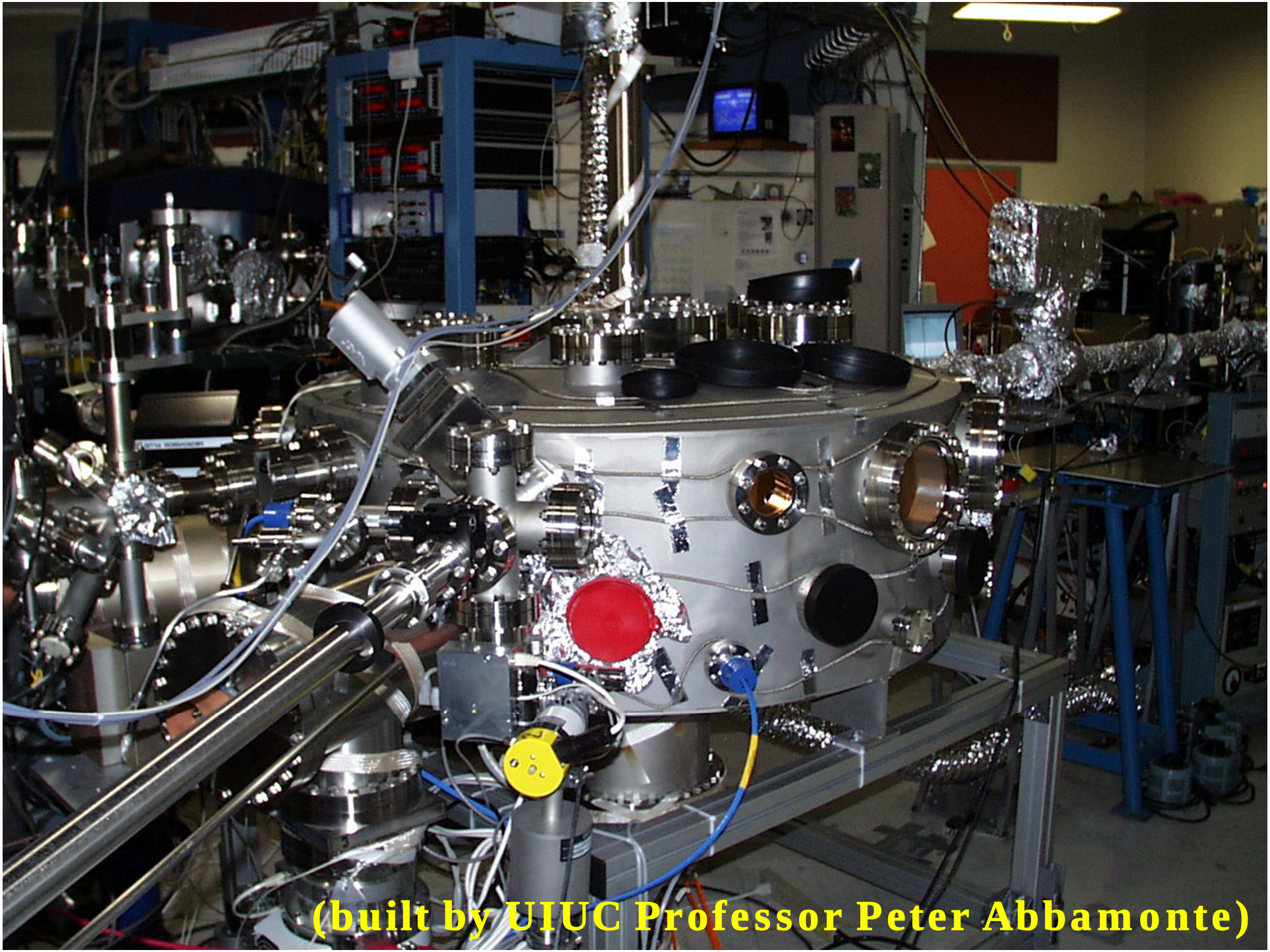
Make the “what you show” and “why it’s of interest” clear.

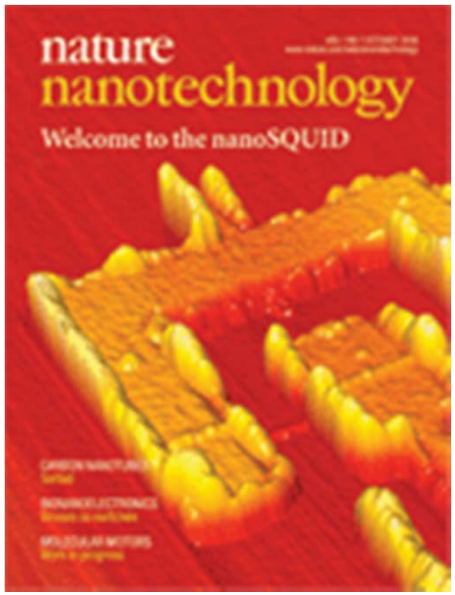
A simple explanation of the set-up/calculation strategy is always helpful.

A clear cover letter is a wonderful thing.

Different Audiences You'll Need to Reach (Who Won't Know Much About What You Do)

- Students
- Potential employer/tenure committee
- Collaborators (sometimes in different fields)
- Funding agent
- Editor
- Public information officer or journalist


(built by UIUC Professor Peter Abbamonte)


nature
nanotechnology
Welcome to the nanoSQUID

Research Skills I Use

Speaking the lingo

Familiarity with the research culture/personalities

Back of envelope calculations

Separating the wheat from the chaff

Research Skills I Never Use

An ability to:

Wheel a tank of liquid nitrogen down a steep parking lot.

Live on vending machine peanuts for 3 days.

Calculate my h-index.

New Skills I Had to Learn

Time management (deadlines, deadlines, deadlines)

Getting to the point

Thinking broadly

People management

Efficient problem solving (not the Clebsch-Gordan coefficient kind)

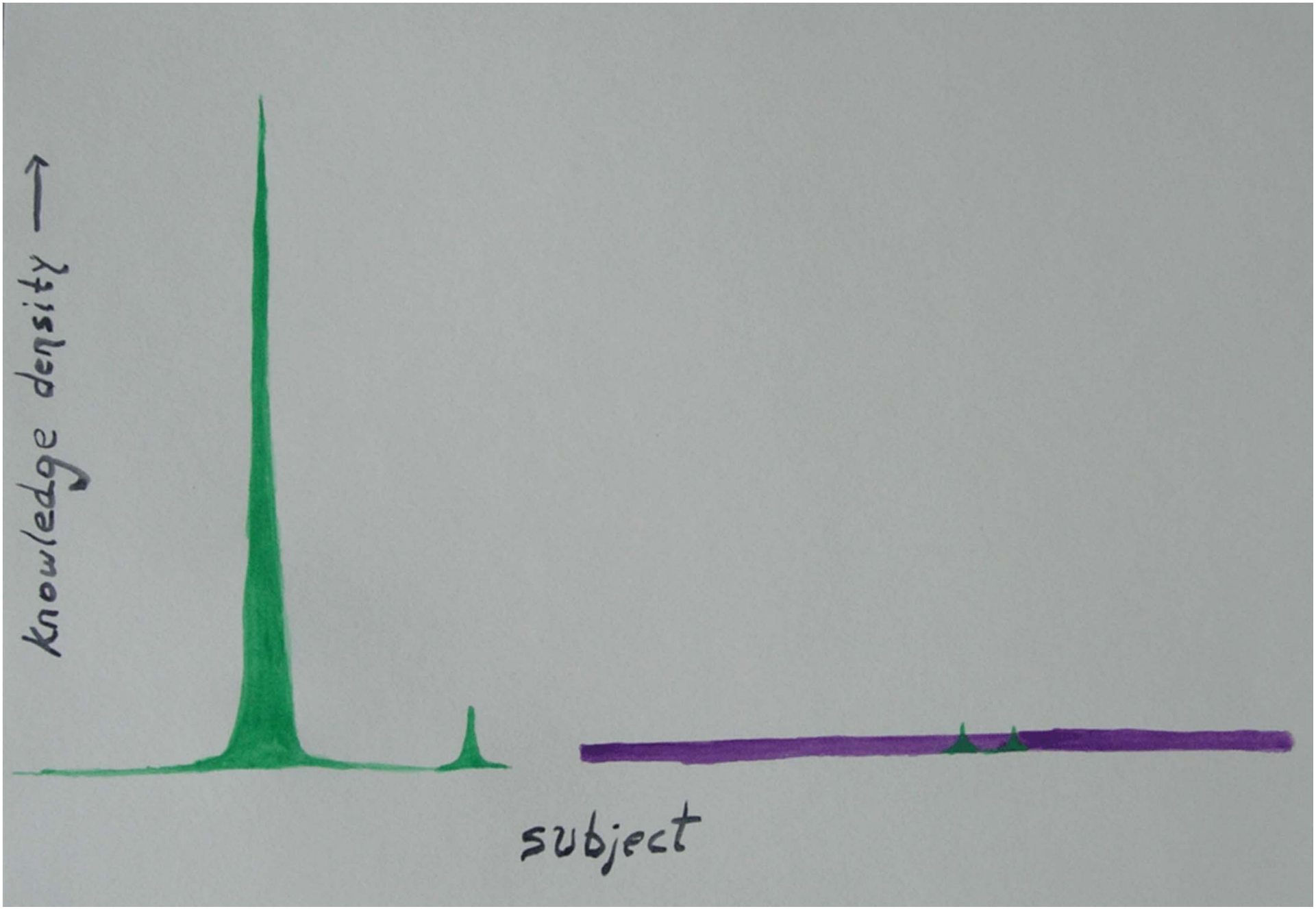
Comparison

More regular hours, but work is more intense/relentless

Comparable to research, more stability

Job change will require you to think outside the box.

Before **After**



Related Jobs

Editor (manuscripts, commentaries, news)

Publishing (new journal or book ideas)

Media relations/Public Information Officer

Outreach and Education

University or R&D administrator

Science writer (staff or freelance)

Thank You

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