Publishing and editing astronomy at Science

Maria J. Cruz, Associate Editor
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Publishing has always been an integral part of the scientific enterprise and a critical step in the research process.

Its purpose: to communicate between scientists and to a broader public.
Philosophical Transactions of the Royal Society (London, 1665)

- A Trial of a Chariot, by Colonel Thomas Blount
- A way of preserving wood, from Theodore de Vaux
- Details of a fatal lightning strike
- Observations of the comet at Rome in 1665
Now…

>16000 journals

(Source: Thomson Reuters)
Publish or Perish…

Advance the field

Enhance career opportunities
Journal Taxonomy

- Specialist disciplinary research
- General multidisciplinary research
- Review journals
- Hybrid news/research/commentary
  (majority peer-reviewed)
Publishers

Learned societies
Commercial publishers
Non-profit publishers
Science was founded in 1880 on $10,000 of seed money from U.S. inventor Thomas Edison
Established in 1848 to represent all disciplines of science

AAAS supports scientific exchange and discussion of science/society issues

Supports science policy, education, and diplomacy domestically and internationally
Editorially independent weekly magazine

Non-profit

Total paid subscriptions ~130,000

Total readership >500,000

Research/news free after 12 months
Beyond DSM: Seeking a Brain-Based Classification of Mental Illness

Modern research in neuroscience and genetics has provided a more sophisticated understanding of mental illness, and harnessing this knowledge to improve the diagnosis of psychiatric disorders was a major impetus for undertaking a revision of the Diagnostic and Statistical Manual of Mental Disorders (DSM).
Exaggerated calcium signaling linked to familial Alzheimer’s disease (Sci Sig): http://ow.ly/1q3yk + http://ow.ly/1q3yk

About 1 hour ago via HootSuite

U.K. to launch its own space agency on 1 April - no for europe (via @bbcnews)

About 15 hours ago via HootSuite
What I Do…

I handle all astronomy and planetary science submissions at *Science* but also papers in a range of other sub-disciplines:

- Magnetosphere
- Solar Physics
- Ionosphere
- Geochemistry (meteorites)

How? By asking really knowledgeable people to help me. The key is finding out who knows what, and building relationships.
What I Do…

Read 1 to 4 papers/day assigned to me (~500/yr)

Comment on papers assigned to other editors (geosciences, physics, chemistry)

Search for reviewers

Evaluate reviews that have come back

Edit papers with positive reviews

Attend meetings, tour labs

A little bit of writing…
ASTRONOMY

Cloudy Down South

Neptune receives much less radiation from the Sun than either Jupiter or Saturn. Like these two large planets, though, it has a meteorologically active atmosphere, with clouds, storms and possibly a global circulation pattern. Most of Neptune’s clouds evolve on a time scale of hours. One cloud, however, has appeared to persist since at least 1989, when it was first detected by the spacecraft Voyager 2. This cloud is located within a few degrees of the south pole, where the troposphere is known to be warmer and where, by analogy with Saturn’s south polar environment, researchers suspect that a vortex may exist. Using the Keck Telescope in Hawaii, Luszcz-Cook et al. observed Neptune’s south pole in the near-infrared, thereby probing the upper and lower troposphere. Images taken over 3 days in July 2007 show the south polar cloud splitting in two and then coming together again. The altitude observed is consistent with cloud formation due to upwelling and condensation of methane gas. Thus, rather than representing a single stable cloud, the bright feature observed by Voyager marks a site of persistent cloud activity, which may be related to a Neptunian south polar vortex and an organized circulation pattern. — MIC

IMMUNOLOGY

Watching of the Sentinels

Natural killer T cells (NKTs) are a subset of unconventional T cells. They express a limited T cell receptor repertoire and recognize lipid (rather than protein) antigens presented by the nonpolymorphic major histocompatibility complex whereas lymph node NKTs were activated by a subset of macrophages located in the subcapsular sinus. — KLM

Cancer

Runaway Remodeling

Valette et al. found that multiple myeloma cells cause bone marrow stromal cells to secrete activin A, which is a member of the transforming growth factor-β family of cytokines and which inhibits the differentiation of cells into...
Research papers published in 2009

- **Geochem Phys**: 4.2%
- **Astronomy**: 1.4%
- **Atmos**: 3.7%
- **Oceans**: 1.0%
- **Paleo**: 1.1%
- **Mat Sci**: 5.7%
- **Planet Sci**: 1.3%
- **Chemistry**: 5.9%
A PHD Tales from the Road

How does a paper get published in a journal like Science or Nature?

María, a junior editor at Science, explains the process...

María: I'm a big procrastinator.

When papers come in, editors like María perform “triage”, picking out the papers they feel are appropriate for science.

They then hand it off to an external board, which coordinates peer reviews.

In all, about 10% of papers submitted make it to print.

I have a 10% chance of getting into Science?

Well, maybe not you.

200 submissions/week
30%
10%
Papers received per week
THE REVIEW PROCESS

Initial evaluation--

SCIENCE Editorial Staff and

Board of Reviewing Editors (~150 international researchers)
What makes a SCIENCE paper?

• **A big step forward** (answer to a long standing question; breakthrough)

• **Broad implications** (different way of thinking; important application)

• **Interest scientists in other fields**
If general interest and significance are judged promising…

25 – 30% of submissions are sent to referees

Referees--2 or 3 international experts in the field
Finding referees

• Board suggestions
• Database records
• Web/literature searches
• Suggested/excluded lists from authors
• Variety of experience levels, backgrounds, institutions, etc.
Ethical guidelines for referees

Qualified
Constructive
Thorough
Disclose COIs

Objective
Courteous
Prompt
Respect confidentiality
What we ask referees

• Give a brief synopsis of the paper
• Analyse the quality of the experiments/observations
• Analyse the validity of the interpretation
• Distinguish from related publications or prior work
• Discuss the paper’s significance and likely impact
Common reasons for rejecting a paper

- Belongs in a specialized journal
- Too little advance over previous work
- Unconvincing data
- Poor analysis
- Observations without interpretation
- Interpretations without observation
Editor’s role after review:

Revision vs. Rejection (the editor decides what gets published)
Presentation at weekly editorial meeting
Editing for clarity/length

Notables:
Consider general reader
Avoid claims of novelty/priority
Avoid passive voice
No excessive speculation
Limit repetitive phrases
Move experimental detail into SOM
Follow length limits
Triangulating to Mechanism

Cellular uptake and release of a variety of substrates are mediated by secondary transporters, but no crystal structures are known for all three fundamental states of the transport cycle, which has limited explanations for their proposed mechanisms. Shimamura et al. (p. 470) report a 3.8-angstrom structure of the inward-facing conformation of the bacterial sodium-benzylhydantoin transport protein, Mhp1, complementing the other two available structures. Molecular modeling for the interconversions of these structures shows a simple rigid body rotation of four helices relative to the rest of the structure in which the protein switches reversibly from outward- to inward-facing.

Microcapacitors for Manufacture

Capacitors can store small amounts of charge, and as they can charge and discharge quickly, they work well with batteries for recovering power, such as in regenerative braking in hybrid cars. For very small power requirements, capacitors have not been competitive with microbatteries, but using monolithic carbon films to store the charge, Chmiola et al. (p. 480) demonstrate the feasibility of such applications. The small pores in the carbon films are sufficiently large to allow electrolyte transport and can be made crystals along their axis. Since growth at different saturation conditions matched predictions, this looks like a promising method to develop rational and controlled synthesis of nanomaterials at large scale and low cost.

Sun Stuff

Comets are thought to be remnants of the Sun’s protoplanetary disk; hence, they hold important clues to the processes that originated the solar system. Matzel et al. (p. 483, published online 25 February) present 1298 isotope data on a refractory particle recovered from comet Wild 2 by the NASA Stardust mission. The lack of evidence for the extinct radiogenic isotope 18O implies that this particle crystallized 1.7 million years after the formation of the oldest solar system solids. This observation, in turn, requires that material formed near the Sun was transported to the outer reaches of the solar system and incorporated into comets over a period of at least two million years.

Of Monsoons and Megadroughts

The Asian monsoon is the weather system that has the greatest effect on the greatest number of people in the world. Naturally then, knowing better how climate change might affect the monsoon is tremendously important. One obstacle that prevents a better understanding
After acceptance:

- Copyeditors/proofreaders/art dept

- Press office may issue a press release or include a summary of the paper in the press package that goes to journalists every week

- Paper may be covered in a Perspective
Hidden Growth of Supermassive Black Holes in Galaxy Mergers

Joel Primack

Black holes are found at the centers of massive galaxies. Although no light escapes from them, their presence can be revealed by the glow of surrounding gases compressed and heated by the driving force of the black hole’s gravitation. This quasar emission ranges from low-energy radio waves to the highest-energy gamma-ray region of the electromagnetic spectrum. Quasar formation obscures our view of galactic centers in the visible to x-ray regions. On page 600 of this issue, Treister et al. present an analysis of data from several space-based telescopes, showing that a greater fraction of quasars that formed in the early universe were obscured by dust, compared with their later stages. This is consistent with observational evidence on the evolution over cosmic time of gas-rich axes is still streaming through the universe and can be detected in some form. Some of this radiation is altered. For example, redshifting occurs because the wavelengths of photons stretch as the universe expands, and some short-wavelength photons like x-rays and ultraviolet light are absorbed by dust and re-emitted at longer wavelengths.

To figure out what happened in the cosmic perspectives

Varying degrees of transparency. (A) Galaxy mergers produce quasars (B) that are first hidden by gas and dust. (C) After about 100 million years, as the quasar radiation blows away the obscuring material, the quasars become visible. The quasar was still be obscured if viewed as seen here, but it would shine much more brightly than the entire galaxy if viewed from some perpendicular directions. The study by Treister et al. shows how the formation of obscured versus visible quasars has changed since the early universe.

Hubble Space Telescope, and infrared (the Spitzer Space Telescope).

What we hope to observe is the evolution of both black holes and their host galaxies, and to understand how both black holes and the stellar spheroids in which they are found can increase their masses by a factor of 100 or more during galaxy mergers. The mass of the black hole at the center of our Milky Way galaxy is relatively light, just 4 million times the mass of our Sun, and it resides at the very

together with their black holes. The gas fuels gigantic bursts of star formation. Some of the stars produced are an order of magnitude more massive than the Sun. Their supernova explosions at the end of their lives produce great quantities of dust that obscure the galactic centers.

A small fraction of the central gas is accreted by the central black hole as an elliptical galaxy forms. The black hole’s mass multiplies by a large factor, and the greater matter is only about 5%, of which only about 0.5% of the total galactic mass is visible as stars, gas, or dust (9).

This agreement between observation and theory shows that the decrease in the fraction of obscured quasars in the nearby (late) universe is a consequence of the decreasing number of galaxies per unit volume as the universe expanded, the decreasing merger rate per galaxy, and the decreasing fraction of gas-rich galaxies as the gas turned into stars. Most of the growth of the mass of the supermassive black holes occurred in the quasar phase, much of it hidden by dust. However, the x-rays from this hidden black-hole accretion should be detectable by new focusing