Announcements

1. Turn in your critiques of the *Astrophysical Journal* articles on transiting planets
2. *Elements of Style* review due next Tuesday (Feb. 2)
3. First draft of statement for application to graduate school due next Thursday (Feb. 4)

Requirements of the Review Paper

- Typical length: 5-10 pages double-spaced text with a few additional pages for figures and references.
- Can be longer, but please don’t ramble
- **Focus on putting together a coherent story**
  - Why is this an interesting topic?
  - Is there a logical flow to the paper?
- **Use graphical information (figures)**
- **Include a reasonable number of scholarly references**
  - Don’t rely excessively on flaky internet sources
  - You can choose the citation format, e.g., endnotes or embedded citations (e.g., “This idea was favored by Tripp (2003), but it is clearly delusional …”)
Requirements of the Review Paper

**First draft due Tuesday, February 16**

Press Release Critiques: Comments on your Comments

**Comment 1**: think about the target audience and their knowledge of the topic, and determine the amount of background material to provide accordingly.

- “This release does not flow smoothly but rather packs a lot of material into a small choppy space. This … will not grasp the uninformed passer-by, as they will probably become bored with the dense information.” *(Mars Rover)*
- “The names of the landmarks have no significance to someone who is not familiar with the terrain of Mars. For me, reading that seemed a little pointless.” *(Mars Rover)*
- “Clearly intended for an audience more familiar with the Mars Exploration…found several terms and locations that I (and the general public) wouldn’t know.” *(Mars Rover)*
- “The release’s one weakness was that it was a little dumbed down…” *(Kepler Planets)*
Comment 1: think about the target audience and their knowledge of the topic, and determine the amount of background material to provide accordingly.

- This is a balancing act. Oversimplification could be insulting, but it is crucial for the audience to understand the main points.
- Too much background will limit the time/space available for new results and new ideas. You’ll make your money on the new stuff that people have not heard before.
- If you’re not sure, it’s better to provide too much background and introduction than too little.
- Avoid excessive terseness, but don’t ramble on either...

Comment 2, “The Schwarzchild Rule”: avoid putting too much material in one article, especially if the topics are not clearly connected.

- “There are three articles merged into one here: the goethite, the frost and its effects on the rovers, and the clouds and their purposes.” (Mars Rovers)
- “This release seems to jam too much information into an article whose length should only do justice to a few findings.” (Mars Rovers)
- “Needs focus – concentrate on one aspect and explain in detail the implications of the discovery.” (Mars Rovers)
- “The main weakness was that many other things were included that were not related to the main goal of the mission and might have been better understood in a separate press release.” (Mars Rovers)
- “I think adding in comments about the rover’s right wheel starting to lose friction is a bit distracting and takes the reader’s mind off the main topic...” (Mars Rovers)
Paper organization.

• Content
  – Which results/discoveries should be included
  – How much introductory/background material is required?

• Writing style
  – Sequence of topic presentation
  – Transitions from one part to the next

This is important. Please invest sufficient effort/thought in the organization of your papers!
Spirit has now driven past the West Spur to ascend Husband Hill itself. One remaining question is whether water was only underground or ever pooled above the surface, as it did at Opportunity's site. "As we climb Husband Hill and characterize the rock record, we'll be looking for additional evidence that the materials were modified by ground water and searching for textural, mineralogical and chemical evidence that the rocks were formed in or modified by surface water," said Dr. Ray Arvidson of Washington University in St. Louis, deputy principal investigator for the rover instruments.

The amount of worrisome friction in Spirit's right front wheel has been decreasing. Meanwhile, rover wranglers at NASA's Jet Propulsion Laboratory in Pasadena, Calif., continue to minimize use of that wheel by often letting it drag while the other five wheels drive. "Babying that wheel seems to be helping," said JPL's Jim Erickson, rover project manager. Both rovers continue working in good health about eight months after their primary three-month missions. "Looks as though Spirit and Opportunity will still be with us when we celebrate the landing anniversaries in January," Erickson said.

A portion of Mars' water vapor is moving from the north pole toward the south pole during the current northern-summer and southern-winter period. The transient increase in atmospheric water at Meridiani, just south of the equator, plus low temperatures near the surface, contribute to appearance of the clouds and frost, Wolf said. Frost shows up some mornings on the rover itself. The possibility that it has a dumping effect on the accumulated dust on solar panels is under consideration as a factor in unexpected boosts of electric output from the panels.

As its last major endeavor inside Endurance Crater, Opportunity made a close inspection of rock layers exposed in a part of the crater wall called "Burns Cliff." Dr. Steve Squyres of Cornell University, Ithaca, N.Y., principal investigator for the rover instruments, said, "In the lower portion of the cliff, the layers show very strong indications that they were last transported by wind, not by water like some layers higher up. The combination suggests that this was not a deep-water environment but more of a salt flat, alternately wet and dry."

JPL has managed the Mars Exploration Rover project since it began in 2000. Images and additional information about the rovers and their discoveries are available on the...
Comment 2, “The Schwarzschild Rule”: avoid putting too much material in one article, especially if the topics are not clearly connected.

- Sooner or later, your audience will saturate, i.e., they won’t retain the information presented.
- Therefore, you should choose the most important objective/result and concentrate on presenting it clearly.
- Too much fiddle faddle could cause the audience to lose track of the information that you really want them to take away from your paper/talk.
- Again, this is often a balancing act...

  “To a person surfing the internet, he or she would get through the first two paragraphs and click the next article.” (Mars Rovers)

Comment 3: think about how to capture and hold the interest of your audience.

- “Provided punch line first, then went back and effectively filled in the details.” (Thin Galaxies)
- “The author knows his audience, the lay person, and describes the results in a way that is both gripping and easily understood.” (Thin Galaxies)
• What makes an article exciting?

**Titles are important.**

Consider one of the press release titles:

“Mars Rovers Spot Water-Clue Mineral, Frost, Clouds”

ON MARTIAN BEDROCK  Haiku??

ROBOT SMELLS GOETHITE, FROST, CLOUDS

WHEEL STUCK AGAIN

__Comment 3:_ think about how to capture and hold the interest of your audience.

*Title style depends on context, but titles should always be clear.*

“Glint of Sunlight Confirms Liquid in Northern Lake District of Titan”

“Even Thin Galaxies Can Grow Fat Black Holes”
To be or not to be (cute), that is the question...

- Is this a good title?
  - Star Light, Star Bright, Its Explanation is Out of Sight

- What about this one?
  - The First Five

Clever/cute titles: exercise caution

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COMPLEX C: A LOW-METALLICITY, HIGH-VELOCITY CLOUD PLUNGING INTO THE MILKY WAY1

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ABSTRACT

We present evidence that high-velocity cloud (HVC) complex C is a low-metallicity gas cloud that is plunging toward the disk and beginning to interact with the ambient gas that surrounds the Milky Way. This evidence begins with a new high-resolution (17 km s⁻¹ FWHM) echelle spectrum of 3C 358 obtained with the Space Telescope Imaging Spectrograph (STIS). 3C 358 lies behind the low-latitude edge of complex C, and the new spectrum provides accurate measurements of O i, Si ii, Al iii, Fe ii, and Si ii absorption lines at the velocity of complex C. N i, S ii, Si iv, and C iv are not detected at 3σ significance in complex C proper. However, S iv and C iv as well as O i, Al iii, Si ii and N i absorption lines are clearly present at somewhat higher velocities associated with a “high-velocity ridge” (HVR) of 24 km s⁻¹. This high-velocity ridge has a similar morphology to and is roughly centered on complex C proper. The similarities of the absorption-line ratios in the HVR and complex C suggest that these structures are intimately related. In complex C proper we find [O iii] = 3.76 x 10²¹. For other species the measured column densities indicate that ionization corrections are important. We see collisional and photoionization models to derive ionization corrections; in both models we find that the overall metallicity Z = 0.1–0.3 Z⊙ in complex C proper, but argon must be underabundant. The iron abundance indicates that the complex C contains very little dust. The size and density implied by the ionization models indicate that the absorbing gas is not gravitationally confined. The gas could be seen as confined by an external medium, but observations we are covering the broad side of the...
Charles Messier and the Messier Catalog
So what is M32? Or M31 and M33, for that matter?

Comment 3: think about how to capture and hold the interest of your audience.

- In past critiques, “boring” has often been a popular adjective. Why?
- What makes an article exciting?

**The first few sentences are crucial.**

“Scientists have identified a water-signature mineral ... one of the mission’s surest indicators yet for a wet history on Mars.”

“Saturn’s big moon Titan is turning out to be the most Earth-like world in the solar system - except that it is utterly, wildly unlike Earth.”

*Capture the readers interest somehow, and don’t bury the punch line.*
Comment 4: think about how the topics of the paper are connected and how to make transitions from one to the next.

- “… seems choppy instead of organized … I disliked the general choppiness of the structure” (Mars Rover)
- “Reads more like a blog than a scientific press release.” (Mars Rover)
- “Flow was another issue with this article. Ideas were broken into two paragraphs or separated by extraneous information…” (Mars Rover)

Comment 4: think about how the topics of the paper are connected and how to make transitions from one to the next.

- In the critiques: “choppy narrative”, “jumps around a lot”, “transitions are not smooth”, “it’s easy to get lost in this article”...

**Good transitions keep the reader focused**

Don’t confuse your readers. If disparate topics must be put together in a paper, strive to show the reader how the topics are logically connected and why they are presented together.
Comment 5: proofreading/editing is well-worthwhile

- “The first few paragraphs are confusing with awkward sentences as the writer seems to remind himself of good points to make while he is writing.” (Mars Rover)

It takes time, but carefully editing is crucial.

Editing can be subtle, and the audience should be borne in mind.

Example from “The First Five”: “… has already measured hundreds of possible planet signatures… many of these signatures are likely to be something other than a planet…”

But then the article explains that stars and planets can be distinguished by the depth of the brightness dip during transit.

So why is this a problem? Isn’t it trivial to sort the planets from the stars?

Comment 6: graphical information is immensely valuable in science writing.

- “The diagram comparing the sizes of the five Kepler planets with Jupiter and Earth put the relationships in perspective for any reader.” (Kepler Planets)

- “The release was lacking in pictures… I would have liked to see some pictures of the spectacular clouds…” (Mars Rovers)
Comment 6: **graphical** information is immensely valuable in science writing.

- “The diagram comparing the sizes of the five Kepler planets with Jupiter and Earth put the relationships in perspective for any reader.” *(Kepler Planets)*
- “The release was lacking in pictures... I would have liked to see some pictures of the spectacular clouds...” *(Mars Rovers)*

Is this graphic really all that useful/effective?

Researchers used a special imaging technique with the panoramic camera on NASA’s Mars Exploration Rover Opportunity to get as detailed a look as possible at a target region near eastern foot of ‘Burns Cliff.’ The intervening terrain was too difficult for driving the rover closer.

View all Opportunity images from this press release
View all Spirit images from this press release