

Extending the Conversation Beyond the Classroom Walls: Teaching with Blogs, Podcasts, and Twitter

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ASMCUE 2011



A Bacterium That Can Grow by Using Arsenic Instead of Phosphorus

Felisa Wolfe-Simon,^{1,2*} Jodi Switzer Blum,² Thomas R. Kulp,² Gwyneth W. Gordon,³ Shelley E. Hoft,² Jennifer Pett-Ridge,⁴ John F. Stolz,⁵ Samuel M. Webb,⁶ Peter K. Weber,⁴ Paul C. W. Davies,^{1,7} Ariel D. Anbar,^{1,3,8} Ronald S. Oremland²

Life is mostly composed of the elements carbon, hydrogen, nitrogen, oxygen, sulfur, and phosphorus. Although these six elements make up nucleic acids, proteins, and lipids and thus the bulk of living matter, it is theoretically possible that some other elements in the periodic table could serve the same functions. Here, we describe a bacterium, strain GFAJ-1 of the Halomonadaceae, isolated from Mono Lake, California, that is able to substitute arsenic for phosphorus to sustain its growth. Our data show evidence for arsenate in macromolecules that normally contain phosphate, most notably nucleic acids and proteins. Exchange of one of the major bio-elements may have profound evolutionary and geochemical importance.

MICROBIOLOGY

Concerns About Arsenic-Laden Bacterium Aired

The debate that erupted 5 months ago over whether a bacterium could thrive on arsenic, even incorporating the element in its DNA, is finally being aired in the scientific literature rather than on blogs. Originally published online by *Science* on 2 December 2010, the paper describing this potentially unprecedented microbe is on page 1304 of the 17 May 2011 issue of the journal, which was written by Felisa Wolfe-Simon and colleagues, authors of the original paper. The work that set off this furor offered an exception to one of the apparently fundamental rules of life on Earth. To survive, microbes, plants, and animals were all thought to require six essential elements: oxygen, carbon, nitrogen, hydrogen, sulfur, and phosphorus. But Wolfe-Simon and colleagues quickly compared the work by NASA and Wolfe-Simon to the work of the chemist Linus Pauling, who proposed that life could be based on silicon instead of carbon. "Their hypothesis is that arsenic can substitute for phosphorus in DNA and other molecules in which phosphorus atoms v

Slate



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The Discovery of Arsenic-Based Twitter

How #arseniclife changed science.

By Carl Zimmer

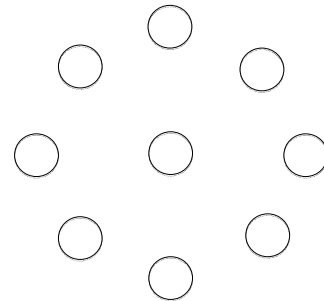
Posted Friday, May 27, 2011, at 4:50 PM ET

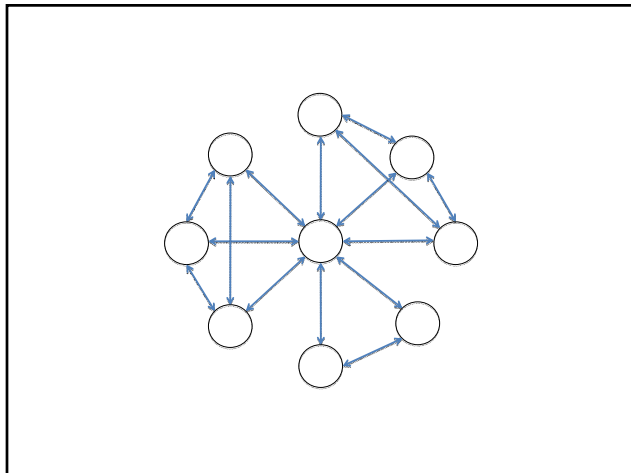
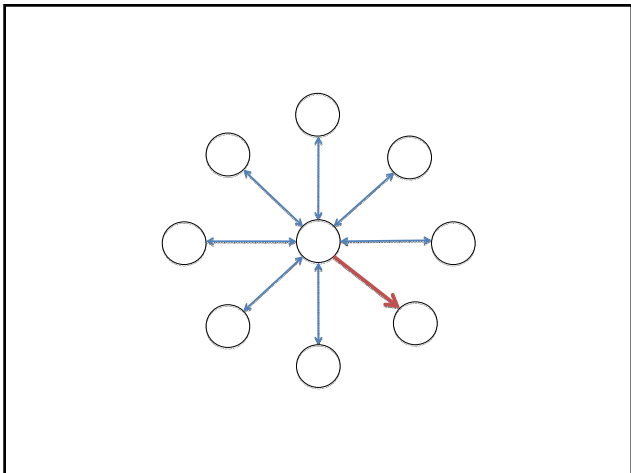
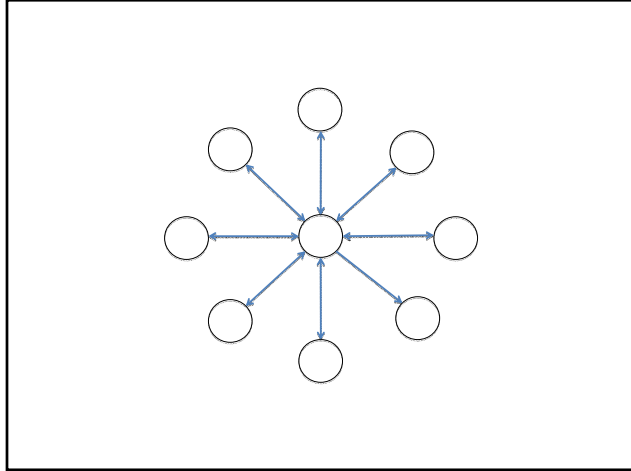
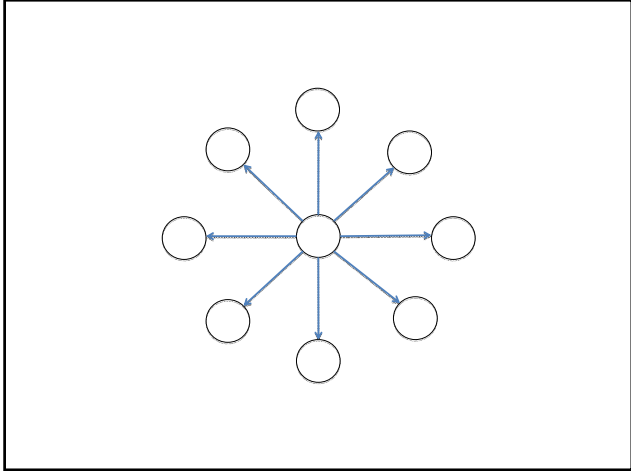
In earlier times, such critics didn't have many options. They could write to *Science* and hope that their letter would be published long after the public's attention had turned to other things. They could write to their local newspaper and try to sum up their objections in 50 words. They could grouse over a beer with likeminded colleagues. Now, however, they can form an online community. Blogging scientists read the #arseniclife paper and aired their complaints. On Twitter, they kept each other up to date on new developments in the story. Within a couple weeks the *New York Times* and the *Washington Post* were reporting not on the *Science* paper, but on the online debate. The center of gravity had shifted.

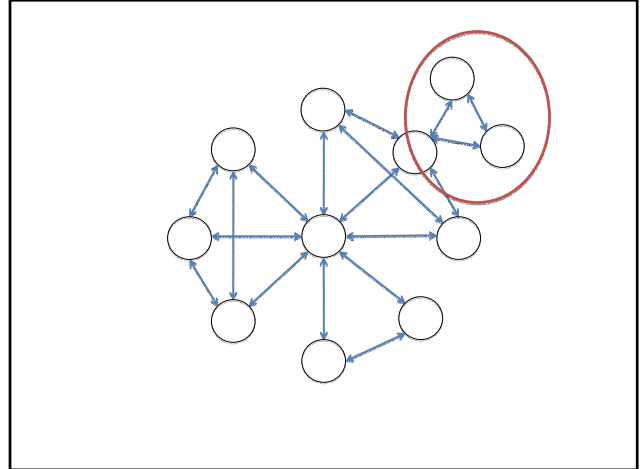
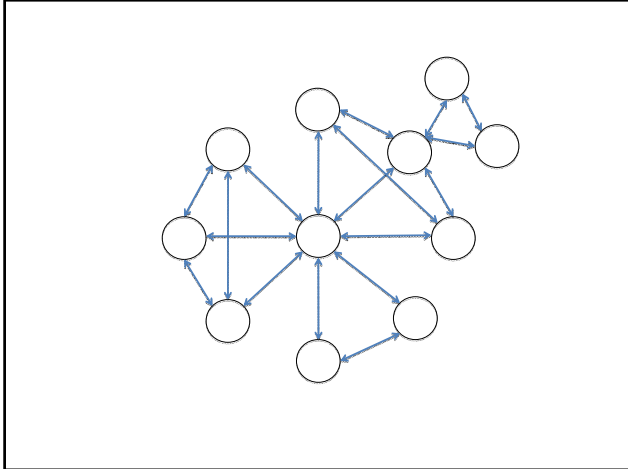
- **Why use new media in the classroom?**
- **BIO361: Biology of HIV/AIDS**
- **Use of blogs and podcasts**
- **Use of Twitter**

Why use new media in the classroom?

- **Extends conversation**
 - **Beyond normal class time**
 - **Beyond normal class topics**
 - **Beyond instructor expertise**
- **Easily accessible anywhere, anytime**
- **“Wow” factor**







BIO 361: The Biology of HIV/AIDS



- Senior seminar course
- Enrollment limited to 12 students
- Chronological examination of pandemic
- Student-led discussions of primary articles
- Discussions of social, political, economic issues
- Non-traditional assignments/assessments

A blog and podcast for undergraduate education

- In depth examination of topic
- Topics
 - Microbicides
 - Gender-based sexual violence
 - HIV/AIDS and national security
- Public dissemination

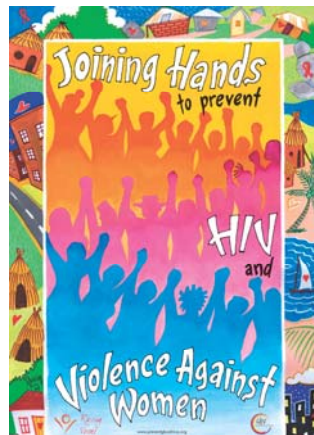
A blog and podcast for public outreach

- Installments are freely available
- One of the top HIV/AIDS iTunes podcasts
- > 12,000 downloads since February 2007
- Carried by various sources
 - International Carnival of Pozitivities
 - The Education Podcast Network
 - Positively Positive
 - About.com: HIV/AIDS

The screenshot shows the homepage of the 'THE AIDS PANDEMIC' blog and podcast. The title is prominently displayed at the top. Below it, a subtitle reads: 'IN THIS BLOG AND PODCAST, STUDENTS OF DAVIDSON COLLEGE AND I WILL EXPLORE THE BIOLOGY OF HIV/AIDS, ITS HISTORY, AND REVIEW THE LATEST SCIENTIFIC ADVANCES RELATED TO THIS PANDEMIC.' The date 'FRIDAY, NOVEMBER 20, 2009' is shown. The main article title is 'Taking Lessons from the CCR5Δ32 Mutation for Patient Treatment'. The author is identified as Lindsay Sween. There are subscription options for 'Posts' and 'All Comments'. An 'ABOUT ME' section features a profile picture of David Wessner and a link to 'VIEW MY COMPLETE PROFILE'. A 'BLOG ARCHIVE' link is also visible.

Gender-based violence and HIV/AIDS

Rebecca Jameson
'07

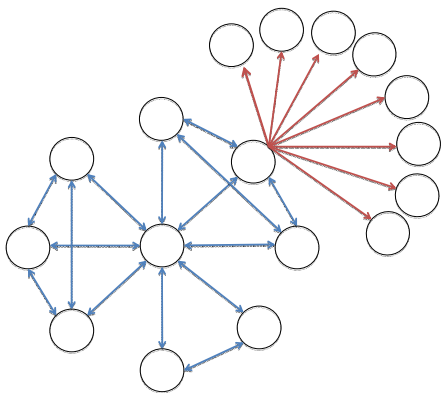
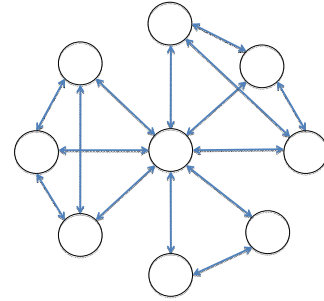


Benefits of blogs and podcasts

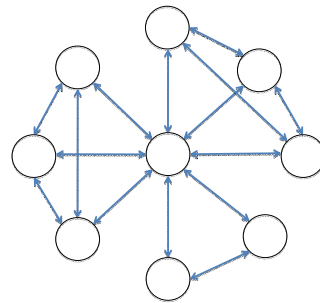
- Wide dissemination
- Greater student ownership
- Some public engagement

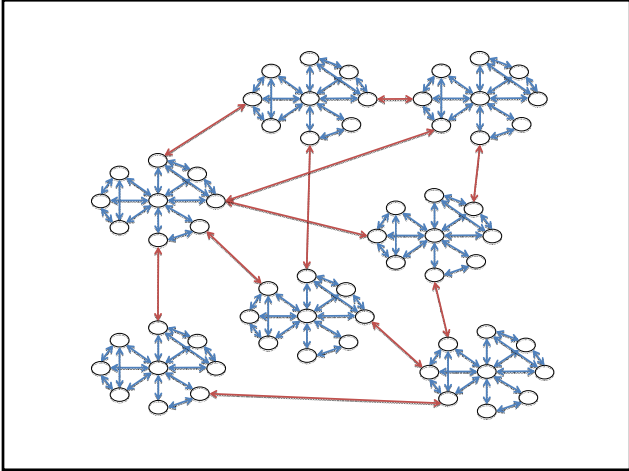
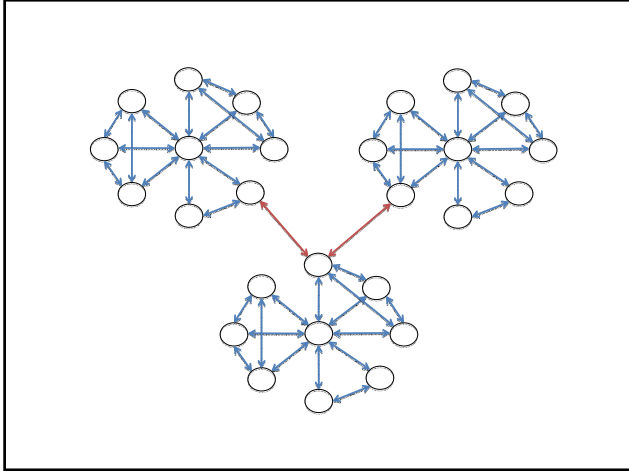
Drawbacks of blogs and podcasts

- **Timing of posts**
- **Time required of administrator**
- **Only limited public engagement**



Using Twitter in the classroom



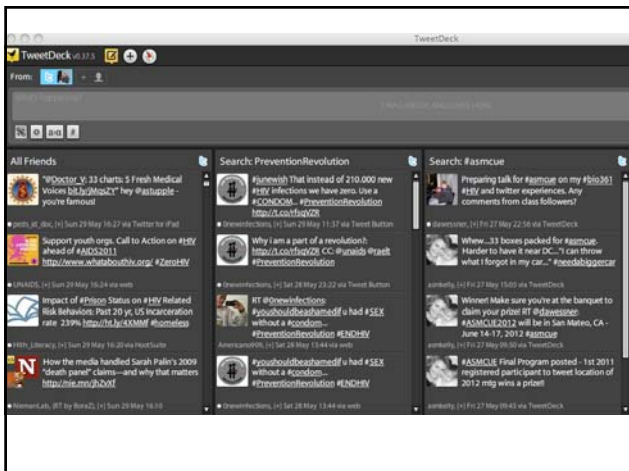
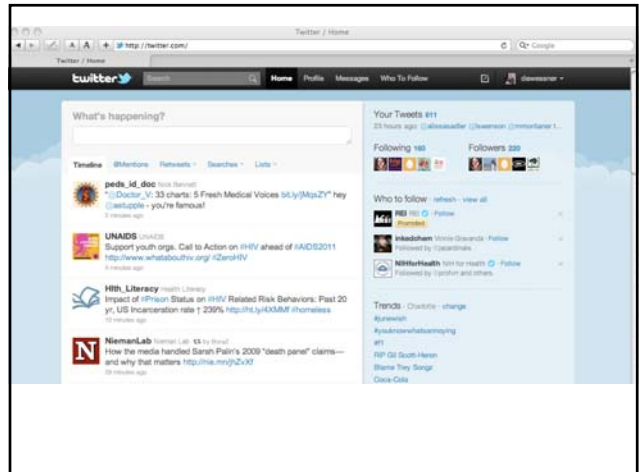
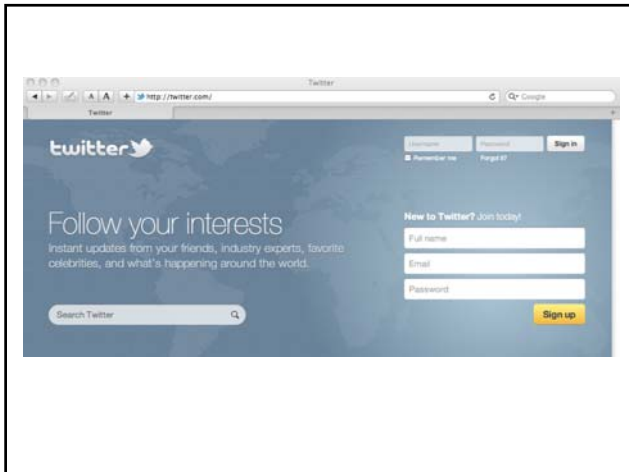


Twitter History

- **Launched in July 2006**
- **Today – 65 million tweets per day**
- **Increasing role academia**
 - **May 2008 – AcademHack: “So you want to microblog (Twitter) with your students**
 - **Chronicle of Higher Ed**
 - > 3 years ago: 17 articles
 - 1 – 3 years ago: 378 articles
 - < 1 year ago: 485 articles

Dialogic Monologic	In-class Back Channel <i>Uses:</i> ad hoc class discussions, real-time commenting, recording divergent viewpoints <i>Benefits:</i> engages less vocal students, archives otherwise ephemeral comments	Outside of Class Discussions <i>Uses:</i> extend class discussions, exchange comments about readings or questions about assignments <i>Benefits:</i> community building, continuity between class sessions	In-class Directed Discussion <i>Uses:</i> Open or guided questions with student responses collected for later analysis <i>Benefits:</i> engages all students in discussions in large lecture classes
	Tracking Activities <i>Uses:</i> find and follow instructor, experts in the field, or key topics <i>Benefits:</i> exposure to the larger cultural conversation about the class material	Lightly Structured Activities <i>Uses:</i> solicit course feedback, offer ambient office hours, poll class, language or writing practice <i>Benefits:</i> flexibility, availability, scalability	Metacognitive/Reflective Activities <i>Uses:</i> students report on self learning, articulate their difficulties, recap the most valuable lesson of the day <i>Benefits:</i> fosters critical thinking
	Institutional communication <i>Uses:</i> community outreach, alerts, announcements	Instructor Communication <i>Uses:</i> announcements, syllabus changes, reminders	Pedagogical Communication <i>Uses:</i> sharing timely links and resources
Passive ← Student Activity Active			

Mark Sample, Rick Reo. George Mason University, 2009



Uses of Twitter in BIO361

- **Spring 2010:** Encouraged students to set up account
- **July 2010:** Tweeting from AIDS 2010
- **August 2010:** Announce #bio361 hashtag
- **Fall 2010:** Tweeting throughout semester
 - Not graded
 - Integrated into class discussion
- **Did it work?**

Twapper Keeper - "We save tweets!" - #hashtag - BIO361 - Fall 2010 BIO361 HIV/AIDS class project

Twapper Keeper - "We save tweets."

HOME SEE ALL ARCHIVES FAQ BLOG Sign in with Twitter

Introducing **Your TwapperKeeper** you can now take TwapperKeeper home with you. archive your own tweets. install, archive, analyze. (and hack - if you're)

If you want to create more than 2 archives... [\[click here\]](#)

search for an archive create #hashtag archive create keyword archive create @person archive

START MONTH	DAY	YEAR	HOUR	MIN	END MONTH	DAY	YEAR	HOUR	MIN	ORDER	VIEW LIMIT	FROM USER	TWEET TEXT
---	---	---	---	---	---	---	---	---	---	---	---		

Summarizr

TwapperKeeper Archive - hashtag - BIO361
 Fall 2010 BIO361 HIV/AIDS class project
 TwapperKeeper archive URL: <<http://twapperkeeper.com/hashtag/BIO361>>

Total tweets: 350
 Total twitterers: 67
 Total hashtags tweeted: 51
 Total URLs tweeted: 126

Top 10 twitterers

dawessner	(109)
KingMightyRoost	(27)
ascrawford11	(18)
peds_id_doc	(17)
mattlotz	(13)
aetiology	(13)
sconnors	(11)
JRatevosian	(11)
papenumetcha	(10)
alissasadler	(10)

80% (280) of the tweets in this TwapperKeeper archive were made by 26% (18) of the twitterers.
 The top 10 (14%) twitterers account for 69% (239) of the tweets.
 59% (40) of the twitterers only tweeted once.

[Permalink]

Top 10 tweeted hashtags

- bio361 (336)
- hiv (91)
- aids (48)
- preventionrevolution (13)
- vdecl (10)
- wad2010 (7)
- ghi (7)
- gay (5)
- usca2010 (4)
- nhas (4)

2010 agree aids biology care cc check class cool drug et field fun fund gallo gay gel help hiv hope host human idea issue lead link list look media news paper policy pope radio re read ready risk seen sex strategy thnx time top topic week women world

TAG @TAGHIVScience @misoike condoms rptly used in 80.3% of sex acts; inc from 78.5% in first 6 mo to 84.3% in mo 18-24 <http://bit.ly/bs378q> (p4) #BIO361

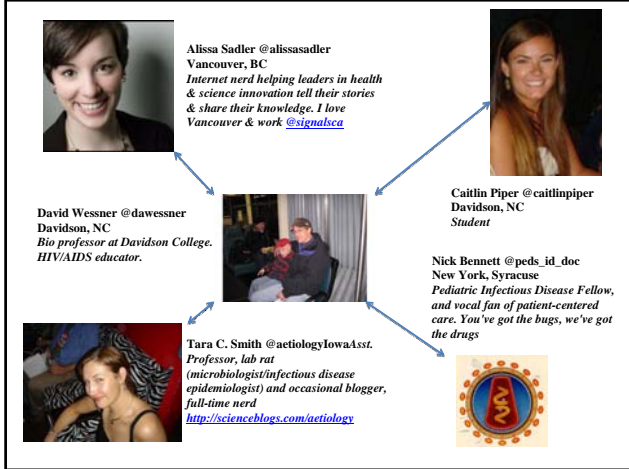
MerilysView RT @andyburke: #BIO361 condoms & counselling always provided in microbicide trials (std of care). So effects seen are on top of imperfect uptake

andyburke #BIO361 condoms & counselling always provided in microbicide trials (std of care). So effects seen are on top of imperfect uptake

lyn4caris All in #BIO361 - Would love to connect if you are interested in the intersection of HIV and faith. See what we do at www.cabsa.org.za

aetiology @misoike #Bio361 condoms can b difficult, esp in Africa. Gels allow women 2 b discreet, protect selves. @TAGHIVScience may hv more thoughts

misoike @aetiology #BIO361 ARV gels appear promising. Would condom use decrease with false 100% confidence in gel? Were they used in the 1st place?



Thanks to:

- Students of BIO361
- Followers of BIO361
- aids.gov
- Davidson College
- Organizers of ASMCUE

