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GENETICS



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From the President's desk:



Most GSA members are probably aware that scientific publishing is in the midst of a storm generated by the open access publishing movement. A large wave has washed on shore and begun to erode the foundations of the journals. While perhaps not a tsunami, it was sizable, and more are approaching shore. The storm is not likely to abate soon.

While storms can wreak havoc, they also have a cleansing effect, washing away old structures to make way for fresh ones that meet new needs. The edifice of scientific publishing, which has not been remodeled for a long time, is getting a fresh look thanks to the possibilities for open access publishing. It has forced authors, editors, publishers, readers and librarians to revisit and revise their relationships to each other and to the public they serve. The GSA, being a publisher that also serves authors and readers (and relies heavily on librarians), has a large stake in the outcome of the open access debate.

The open access challenge presents a great opportunity to improve the way we communicate our science, and we are seizing that opportunity. The GSA Board of Directors and Editor-in-Chief Elizabeth Jones have embraced open access publishing: preprints of accepted manuscripts are available free online within a few days of their acceptance for publication; the Journal is freely available online three months after publication. We are giving our authors' work the broadest possible exposure, fulfilling better than ever the main mission of our society: to promote the communication of advances in genetics.

However, open access also poses a significant financial threat to the GSA. The Journal generates about \$1.5M/year, approximately 75 percent of the Society's revenue. The lion's share of that (~\$1.1M) is from institutional (mostly library) subscriptions; the rest is from author (page) charges. But it costs nearly that much (~\$1.35M/year) to produce and distribute the Journal, leaving little to support other important initiatives of the Society (such as the recent loading on the internet of all issues of the Journal—back to 1916—at a cost of over \$150,000).

Providing the Journal free of charge risks losing subscribers, and the lost revenue would have to be replaced. Unless a generous (long-term) donor steps forward (as occurred for the PLoS journals), authors will have to shoulder the burden. If all institutional subscriptions were cancelled, the authors' page charges (currently \$650 for a 10- page paper) would need to almost quadruple (to \$2,500) to obtain the revenue necessary to print and distribute the journal.

Would librarians abandon their subscriptions? If so, how quickly? Of course no one knows, but that does not seem imminent. A subscription to the Journal does not strain library budgets,

Continued on page 7

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GSA Profile

TIM STEARNS: A Researcher Committed to Genetics Education

How a Genetics Education Experience Bred a Genetics Education Leader

(Based on a conversation with Judith Benkendorf)

Tim Stearns turned the experience of his first undergraduate genetics course into a life-long commitment to genetics education. The Chair of the newly formed GSA Education Committee began his own education at the University of Massachusetts at Amherst as a botany major and reminisces “at that time my life’s ambition was to run a greenhouse.” But a sophomore year course in genetics piqued his interest in research, leading Stearns to transfer to Cornell University where he completed his undergraduate education in genetics and worked in Tom Fox’s lab on yeast mitochondrial genetics.

Stearns earned his PhD in David Botstein’s lab, then at MIT, and it was Botstein’s example that first made him aware of the symbiosis between research and teaching, “They are interrelated – doing one helps you do the other well.” Stearns now does both as an Associate Professor of Biological Sciences and Genetics at Stanford University, where he has received both undergraduate and graduate teaching awards. His lab works on understanding the structure and function of the microtubule organizing center, a direction influenced by his experience as a post-doc in Marc Kirschner’s lab, then at UCSE.

Like his mentors, Stearns is a strong advocate of being active in scientific societies such as GSA. “It is essential that we have practicing scientists involved in publishing our science, in making decisions about our field, and advocating for our most important issues. When Mark Johnston asked me to form an Education Committee for GSA, I jumped at the chance.”

Stearns intends to model the Education Committee after those of the American Society for Cell Biology and the American Society of Human Genetics, without duplicating efforts. “The GSA focus on basic research and the study of model organisms provides so many educational opportunities. We must communicate the significance of that basic genetic research to the public. Most importantly, we have to ensure that undergraduate genetics education is of the highest quality, so that we are training the best students to be the next generation of geneticists.” Stearns went on to note a major paradox of academic life – that even the most accomplished scientists usually have had no training for teaching. “I find it remarkable that faculty at major research universities rarely talk about the practice of teaching. We should include sessions on education at the GSA-sponsored meetings so that people who think hard about teaching can actively participate in the meeting and feel that their contributions are welcome.”

Stearns recently received a prestigious Professor grant from the Howard Hughes Medical Institute to implement his ideas about undergraduate science education. He is using the funds to develop a “Pre-Grad program” at Stanford, providing “an alternative to the predominant pre-med culture among biology majors.” The purpose is to “get some of the best young students excited about research early on, and to help them understand the way the scientific enterprise works.” Stearns recently brought six Stanford sophomores to the GSA-sponsored Yeast Genetics Meeting in Seattle. “The students had just completed a yeast genomics lab course and were in awe of all the great science at the meeting.” To add to the experience, the class poster that the students presented received an honorable mention in the GSA poster contest.

When asked to compare his overlapping roles as researcher and educator, Stearns spoke enthusiastically about the gratification that comes from watching students learn. “When they ‘get it,’ they are tremendously excited, and they truly appreciate the effort that you put into teaching. For me, nothing is more satisfying than seeing students get to the point where they can say ‘I have a different idea about how this works, and here’s how I could test it’. In the lab or in the classroom that’s where it really all begins.” The GSA is fortunate to have an outstanding and enthusiastic member at the helm of the Education Committee.

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Upcoming Reports in *GENETICS* by R. Scott Hawley

The September issue of *GENETICS* includes four papers that may be of special interest to our readers.

Title: Estimating the degree of saturation in mutant screens Authors: D. D. Pollock, and J. C. Larkin

Those of us who spend much of our time performing mutant screens want to be able to estimate the degree of "saturation" of the screen. The authors evaluate existing methods for doing this, and provide what they believe to be an improved method. They validate their method by evaluating their estimates of the number of genes not detected in a mutant screen in a region of the *Drosophila* genome for which there is an independent genomics-based estimate of the number of undetected loci.

Title: Division of labor among the yeast Sol proteins implicated in tRNA nuclear export and carbohydrate metabolism

Authors: D. R. Stanford, M. L. Whitney, R. L. Hurto, D. M. Eisaman, W. Shen, and A. K. Hopper

This paper describes an interesting multigene family that encodes proteins with surprisingly different functions: Sol1 and Sol2 are involved in export of tRNA from the nucleus; their orthologues Sol3 and Sol4 are enzymes that catalyze the 2nd step of the pentose phosphate pathway! The Sol proteins may define a new type of protein family, because the authors are unaware of another example of a protein family whose individual members function in distinct biochemical pathways.

Title: Does Crossover Interference Count in *Saccharomyces cerevisiae*?

Authors: Franklin W. Stahl, Henriette M. Foss, Lisa S. Young, Rhona H. Borts, M.F.F. Abdullah, and Gregory P. Copenhaver

The meiotic-specific recombination proteins Dmc1, Mnd1 and Hop2 are required by organisms, such as yeast, that require double strand breaks for normal pairing and synapsis. However, these proteins are absent in organisms which appear to pair homologous chromosomes during meiosis either through pairing sites or by a continuation of prior somatic pairings. Beginning with this observation, this provocative paper proposes that the role of the Dmc1 protein lies in a pathway that uses the repair of leptotene breaks to lock homologs together. They further propose that such repair events will not generate chiasma interference, while those repair events that occur in pachytene in both types of meiotic systems will exhibit crossover interference.

Title: Gene conversion and crossing-over along the 405-kb left arm of *Saccharomyces cerevisiae* chromosome VII

Authors: A. Malkova, J. Swanson, M. German, J. H. McCusker, E. A. Housworth, F. W. Stahl, and J. E. Haber

The paper provides the first comprehensive data set for all crossover events along a chromosome arm in budding yeast. Analysis of these data by methods that retain the information inherent in tetrads reveals that about 8-12% of exchanges are randomly dispersed and non-interfering. In addition, the authors provide strong evidence for the long standing suggestion that gene conversions not accompanied by crossing-over do not generate chiasma interference, whereas gene conversions that are associated with exchange do generate interference.

Web Page Open for GSA Award Nominations

GSA members have until Friday, October 1, 2004 to nominate, via the GSA Web site, candidates for three 2005 award medals. The awards are for the Thomas Hunt Morgan Medal, for a lifetime of contributions; the Genetics Society of America Medal, for outstanding contributions in the last 15 years; and, the George W. Beadle Award for outstanding contributions to the community of genetics researchers. Last year was the first year GSA members were invited to nominate awards candidates over the Internet and the response was overwhelming with more than 40 submissions. Don't miss out on this opportunity for this year! For more information and to make your nominations, see www.genetics-gsa.org and click on "For And About Members" for a history of awardees and the online nomination form.

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Highlights of the 2004 Yeast Genetics and Molecular Biology Meeting

University of Washington, Seattle, July 27-August 1, 2004



1- Jef Boeke, left, Johns Hopkins University School of Medicine, Baltimore, MD, is presented with the Ira Herskowitz Award by Gerry Fink, Whitehead Institute for Biomedical Research, Cambridge, MA.

2- Ronald Davis, left, is presented with the GSA Lifetime Achievement Award by Mark Johnston, GSA President.

3- Susan Lindquist, right, Whitehead Institute of Biomedical Research, Cambridge, MA, with Lee Hartwell prior to presenting the Lee Hartwell Lecture named in his honor.

4- Anita Hopper, GSA Secretary, third from right, with Poster competition winners, from left to right, Peter Houston, Jem Efe, Devin Scannell, Robert Reid, Marijana Radonjic, Anna Ballew, Hopper, Masaschi Yukawa, and Linda Palmisano.



In Memoriam

We note with sadness the recent passing of our colleague Ed Lewis. Some of Ed's fundamental contributions to developmental genetics were recognized with a Nobel Prize, but his other accomplishments were equally central to our modern concepts of genetic analysis, and became part of the fabric of modern genetics. In addition to his truly seminal studies of the genetics of development, he also did pioneering work on the nature of the gene, on mechanisms of mutagenesis in *Drosophila*, and on chromosome structure. He represented the very best of the science we call "genetics" and he will be sorely missed.



News from the Databases compiled by Paul Sternberg

The Model Organism Databases have become essential resources for geneticists. Highlighted here is news from some of these databases.

The databases rely heavily on **YOU** to tell them what is missing, what is wrong, and what is hard to use. **Please email them whenever you think of something that could be improved.** And, when writing your papers, please help the database curators extract the information by including a short bit of nucleotide sequence to identify the site in the genome being studied, by stating what strain you used, and by including in the abstract the Latin name of the species being studied (thereby making it easier for the curators to identify relevant papers).



SGD: Saccharomyces Genome Database [www.yeastgenome.org]

- The *S. cerevisiae* genome sequence has been updated, and mistakes in the annotations have been corrected. A complete list

of the changes is available at:

<http://www.yeastgenome.org/sequenceupdates.shtml>.

- We think users will be pleased that SGD now has the popular genome viewer, GBROWSE (thanks to Lincoln Stein, Wormbase, and the GMOD project). This useful new resource can be found at: <http://www.yeastgenome.org/cgi-bin/SGD/gbrowse/yeast>

ZFIN The Zebrafish Model Organism Database [http://zfin.org]

- ZFIN is expanding its gene expression database with an updated, easy-to-browse anatomical ontology for finding gene expression patterns.
- New methods are being developed to annotate mutant and morpholino phenotypes, using controlled vocabularies for anatomical structures, processes, and defects.
- ZFIN is using Gene Ontology (GO) to describe characterized and uncharacterized genes. Check out the GO article in the ZFIN summer newsletter (available on the website in August) for a quick review of GO usage.



WormBase [www.wormbase.org]

- The *C. elegans* genome sequence is now complete! Its 100,278,047 base-pair sequence has no gaps (only 6 contigs, corresponding to the 6 chromosomes!) and no N's! Congratulations to the *C. elegans* genome sequencers and the *C. elegans* research community for this spectacular achievement!
- WormBase provides frozen views of the entire database twice a year, to allow common, stable references in publications. These can be accessed at URLs of the form: <http://ws120.wormbase.org>, starting with release WS100.
- Textpresso, a full-text search engine is now integrated with WormBase and has 60% of the papers rich in information about *C. elegans*. This useful tool allows searches by keywords and by categories such as any "gene," "regulation," "cell," etc.



MGI:

Mouse Genome Informatics [www.informatics.jax.org]

- All available mouse sequences are integrated with the rich biological knowledge of mouse genes and strains in version 3.0 of MGI. Controlled vocabularies ensure accurate and complete querying of the database.
- The sequences associated with a gene or marker in MGI can be downloaded directly in FASTA format or forwarded to MouseBLAST at MGI.
- The GXD Expanded Query Form enables users to search for genes expressed in specific anatomical structures and/or developmental stages.
- Electronic books available at MGI:
 - *The Coat Colors of Mice* by W. K. Silvers, which illustrates many of the central concepts of genetics, such as allelic series, gene interaction, and epistasis
 - Lee Silver's *Mouse Genetics*.



tair

The Arabidopsis Information Resource [www.arabidopsis.org]

- The mutant *A. thaliana* lines from

the SAIL (Syngenta Arabidopsis Insertion Library; formerly the GARLIC) collection, which have been generously donated by Syngenta without restrictions, are being distributed by ABRC (Arabidopsis Biological Resource Center). Registered researchers can search for lines of interest and order them at TAIR.



FlyBase [www.flybase.org]

- CytoSearch, a wonderful new search tool that allows users to see the genes, transcripts, and rearrangements in a cytological region is now available in FlyBase. This tool nicely integrates modern molecular information with the classic cytological map of the fruitfly genome.





Preservation of Our Intellectual History

Conversations in Genetics, Volume 2 is now available for sale on CD. Volume 2 includes conversations with Seymour Benzer, Jim Crow, Ira Herskowitz, Dan Lindsley and Janet Rowley. This project, to capture our intellectual heritage in videotaped interviews with the leaders in the field, was the brainchild of GSA member Shelly Esposito and has been produced with the financial support of the GSA. The first volume, released on CD earlier this year, included conversations with Lee Hartwell, François Jacob, Ed Lewis, Arno Motulsky and Evelyn Witkin. Like the first set of interviews, Volume 2 is an inspiring educational resource for anyone reflecting upon the path of genetics research over the last 50 years. For more information and to order your set, visit <http://www.genestory.org>. Each volume of 5 CDs is \$75 or \$20 for individual CDs.

CONVERSATIONS *in* GENETICS

An oral history of our intellectual heritage in genetics is presented in a video collection of captivating interviews with prominent scientists who have made major contributions to the conceptual development of modern genetics. The series provides a rich resource for anyone interested in the evolution of scientific ideas.

VOLUME 2

TALKING WITH:	INTERVIEWED BY:
<i>Seymour Benzer</i>	<i>David Anderson</i>
<i>James F. Crow</i>	<i>Daniel L. Hartl</i>
<i>Ira Herskowitz</i>	<i>Jasper Rine</i>
<i>Dan Lindsley</i>	<i>R. Scott Hawley</i>
<i>Janet D. Rowley</i>	<i>Alfred G. Knudson</i>

The series is directed by Rochelle Easton Esposito and produced under the auspices of The Genetics Society of America and The American Society of Human Genetics

Volume 2 is now available. Purchase online at www.genestory.org

Public Policy Update Continued from page 8

Support for Scientific Citizenship

Practicing scientists have little time to explain their work to nonscientists, and require support if they are to be good scientific citizens, i.e., scientists who help the public and elected officials understand the impact of basic research on human health. This need is met by the **Congressional Liaison Committee (CLC)** of the Joint Steering Committee for Public Policy (JSC; <http://www.jscpp.org/about.html>), which the GSA participates in and supports financially. The CLC provides a direct link between bench scientists and biomedical research policymakers.


CLC staff support GSA members' efforts by:

- issuing *via* e-mail, alerts and updates on important issues that affect the scientific enterprise. These alerts make it easy for you to contact your representatives by providing their names and contact information, along with 'talking points' and relevant background information that you can use in your letters to members of Congress.
- providing sample letters and suggestions for opinion pieces for placement in the local media.
- organizing visits to Washington for scientists to meet with their representatives in Congress. The JSC is hosting **Capitol Hill Days** on September 15 and October 6.
- arranging a visit for you with your Congressperson in your local district.
- providing personalized staff support to answer questions, provide information and facilitate your involvement with all of these tasks.

Visit the JSC's Online Advocacy Center at <http://capwiz.com/jscpp/home/> for more information and resources.

There is no cost to join the CLC. GSA Members can participate by registering online at <http://www.jscpp.org/clc.html> or by contacting Matt Zonarich directly at (301) 347-9309 or mzonarich@jscpp.org.

GSA on Capitol Hill



GSA member, David Botstein, left, Princeton University, NJ, with Rep. Rush Holt (D-NJ) at a recent JSCPP sponsored Capitol Hill Day.



From the President's desk:

Continued from page 1

because the rate is among the lowest (\$735 in 2004), and many librarians seem happy to support scientific societies by maintaining their subscriptions. But, as library budgets get squeezed, as they certainly will, there will be increasing pressure on librarians to not pay for something that is free. We are watching this closely, and will adjust fees as necessary. While a significant increase in page charges does not seem imminent (knock on wood...), more of the financial burden is likely to be transferred to authors over the next 5-10 years.

Publishing costs could be kept low (\$930 for a 10- page paper) if the journal were to be published exclusively online. But, with no journal to distribute (and no fees for online access), could the GSA retain its members? Yes, by offering other compelling reasons to join, and the GSA Board is redoubling its efforts to make the Society serve the community of geneticists with new initiatives, including the formation of an Education Committee (see member profile in this issue). Future editions of GENetics will feature other initiatives underway.

What can you do to help us emerge from this storm a stronger Society? Maintain your GSA membership, and encourage your colleagues to join the Society. If you are comfortable accessing the journal online, next time you renew your membership, check the box that says you do not want to receive the printed copy of the Journal (reducing printing and mailing costs). Encourage your librarian to maintain your institution's subscription to the Journal. But, most important, get involved with the GSA. Send us (at society@genetics-gsa.org) your ideas and suggestions for how the Society can better serve you and your colleagues. Together we can weather this storm, and I am confident we will be stronger for it.

Sincerely yours,
Mark Johnston

Resources Enabling the Awesome Power of Yeast Genetics!

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Public Policy Update

NIH/NSF Funding

In July, the House Appropriations Committee approved an FY05 appropriations bill that provides \$28.527 billion for the NIH, an increase of \$727 million or 2.6% over FY 2004. House Labor-HHS Appropriations Chairman Ralph Regula (R-OH) said the bill represented “the best use of the funds available” under the proposed FY 2005 budget resolution. The NSF budget took a step back: the \$5.5 billion approved by the House subcommittee is \$111 million below the FY04 funding level. “I can’t remember the last time we funded NSF at below the previous year,” noted House Appropriations Committee Ranking Member David Obey (D-WI). However, the budget remains in limbo because it appears likely that it will not be considered until after the November election.

Stem Cell Update

The stem cell debate is heating up once again on Capitol Hill with renewed efforts to pressure the Administration to expand the number of stem cell lines eligible for federal funding. In April, 206 members of the House sent a letter to President Bush asking him to lift the restrictions on stem cell research; a similar effort in the Senate garnered a clear majority of 58 Senators, including many prominent conservatives. The aftermath of the death of President Reagan saw an avalanche of press attention on this issue. To build on that momentum, a letter signed by 142 patient groups, universities and scientific societies (signed for the GSA by the JSC, our public policy arm) was sent to the White House in June urging the President to relax his policy. Representatives Michael Castle (R-DE) and Diana DeGette (D-CO) have proposed new stem cell legislation that would allow funding of research on stem cells derived from excess embryos created for fertility treatment purposes. Despite the momentum in favor of expanding the Administration’s current policy, the White House is adamant that the President will not change his mind.

Continued on page 6