

# Section on Statistics in Genomics and Genetics

ASA SSGG Quarterly Newsletter: Dec 2021

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## Upcoming Events

Please check our website for details.

<https://community.amstat.org/sectiononstatisticsingenomicsandgenetics/meetings/upcomingevents>

## Announcements

- Short Course on An Introduction to Deep Learning in Omics (see page 3 for details).
- SSGG Career Development Workshop on Leveraging Mentorship (see page 4 for details).
- Student Paper Award Competition (see page 7 for details).
- Call for Topic-Contributed Session Proposals for JSM 2022 (see page 7 for details).

## Contents

Upcoming Events .....	1
Announcements .....	1
Member Survey Report .....	2
Short Course: An Introduction to Deep Learning in Omics .....	3
Career Development Workshop: Leveraging Mentorship.....	4
Call for Submission for Student Paper Award Competition .....	5
Call for Topic-contributed Session Proposals .....	5
Job Opportunities .....	6
Join US.....	7
Section Executive Committee.....	7
Contact Us.....	7
Keep Connected.....	7

# Member Survey Report

The SSGG Membership Engagement Committee distributed a survey to section members during summer 2021 to get feedback about how the section can best serve its members. In total, seventy-eight (78) members responded: 23 students, 1 postdoc in academia, 44 faculty, 7 employed in industry, 2 employed in government, and 1 employed in a non-profit organization. Below, we briefly summarize the results of the survey. We welcome section members to continue communicating with us about these or other topics with feedback or suggestions. Please see the Contact Us Section for contact information.

**SSGG Communication with Members.** SSGG members were asked what content they would like SSGG to post on our SSGG social media accounts (Twitter: [@ASA\\_SSGG](#), LinkedIn: [ASA: Section on Statistics in Genomics and Genetics](#), Facebook: [Statistics in Genomics and Genetics - American Statistical Association](#), and Instagram: [sogg.asa](#)). 91% were interested in hearing about research and skill-building events, followed by job opportunities (74.6%) and papers (62.7%). Regarding how often members want to hear from SSGG, 70.1% would be interested in receiving a monthly email, 54.5% appreciate receiving the quarterly newsletter, and 35.1% would be interested in updates on Twitter.

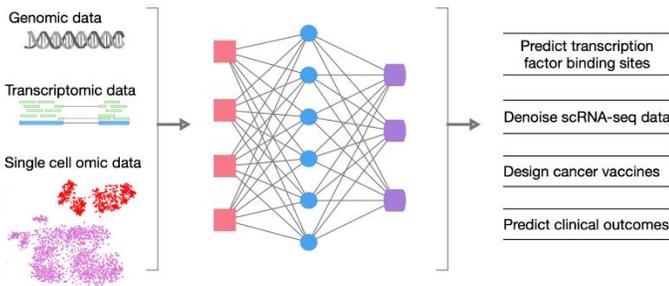
**Webinars and Events.** Members were asked to rank their interest in several types of events: traditional research webinars, emerging challenges in SGG, use of public research data, computing platforms, and skill-building events. There was substantial interest in each type of events, with the largest proportion of members ranking emerging challenges (33%), research webinars (26%), and public data (22%) as their top choice event. Other event suggestions included short courses, grant application workshops, R package reviews, advice about building research collaborations, and events targeted towards those transitioning into omics research from a different area of (bio)statistics. With respect to topic areas for research webinars, the highest proportions of respondents indicated interest in human genetics (77%), omics (79%), and microbiome/metabolomics (59%).

**Mentoring and Professional Development.** The Member Engagement Committee has been brainstorming ideas for enhancing the mentoring and career development experiences of ASA SSGG members. With that in mind, we asked the question “Would you be interested in participating in a short-term (<1 year) student mentoring program?”. Of the 78 survey respondents, 39 (50%) expressed interest in this program and 34 (44%) were undecided. Among those interested in this program, 23 expressed interest in participating as a mentor and 16 as a mentee. Eight students and 20 faculty were undecided and 1 student showed interest in participating as a mentor. Given that half of the respondents showed interest in this program, the committee will deliberate over this idea in the coming year. Respondents were also given the option to suggest events. Suggestions included: career development and networking events for junior faculty, peer mentoring groups, and mentor matching.

**Student Events.** In this survey, 2 questions regarding student webinars were asked. 24 responses were collected in ranking interested webinar topics led by students. The 3 topics with highest student interest were software development, manuscript writing, and the job search, followed by internship panels, student research opportunities, and graduate school applications. Seven respondents provided suggestions about how to encourage participation and involvement in student webinars. 3 faculty members suggested student-led and shorter talks (15 minutes each); 3 student members recommended selecting topics related to students' interests that were understandable for a general audience, as well as asking faculty members to nominate student speakers; 1 industry member suggested having individual schools run their own events with help from SSGG.

# Happy Holidays!!

# Short Course: An Introduction to Deep Learning in Omics



**Instructors:** Dr. Wei Sun and Dr. Nancy R. Zhang

**Date:** Jan 11, 13, 18, AND 20, 2022 (4X1.5 hour sessions over two weeks) | 3:00 – 4:30 PM (EST)

## Registration:

<https://www.eventbrite.com/e/workshop-on-deep-learning-in-omics-taught-by-profs-wei-sun-nancy-zhang-tickets-214416825497>

## Course abstract:

Deep learning has made many breakthroughs in the areas of computer vision and natural language processing. Recently, it has also demonstrated good performance in some genomics problems. However, genomic data are different from imaging and language data in many aspects and thus successful neural networks for imaging or language problems (e.g., deep convolutional neural network) may not be directly applicable to genomic problems. In this short course, we will start with a quick introduction to the background of deep neural networks and their implementation, aiming for a high-level understanding. The bulk of the course focuses on demonstrating the application of deep neural networks in genomic problems. Using these applications, we will illustrate the following general themes:

1. Importance of high quality, relevant features
2. Importance of diverse labeled training data
3. How deep neural networks can be applied to data of multiple modalities
4. Multitasking: using the same network for different prediction/reconstruction tasks

5. Integrating statistical modeling with deep learning concepts
6. Transfer learning to borrow information across data sets
7. Network interpretation

We will conclude with some general discussion on the types of genomics problems that are suitable for various types of deep learning approaches. This short course is designed for participants with basic knowledge of statistics, molecular biology, and is familiar with at least one programming language such as R. We will focus on concepts, intuition, and rationale rather than programming. Participants with a background in deep learning will find part of the first lecture to be a refresher on the fundamentals, and those without this background may want to supplement the course with self-study or another course on the technical details of the subject. Our examples will be implemented in Python using TensorFlow or PyTorch, though no background of Python or TensorFlow/ PyTorch is required. We will prepare reproducible examples and share relevant data and annotated code through GitHub, so that participants can review and practice at their own pace.

## Learning objectives

1. Learn the basic of deep learning, including different options of neural network architecture, optimization, and regularization.
2. Master the skills to build different types of neural networks through examples, and these examples can be used as templates for future implementations.
3. Gain an overview of successful applications of deep learning to genomics, and the features of these problems that allow deep learning to be successful.
4. Understand some theoretical justification for deep learning, which helps in choosing between deep learning and other statistical learning methods for a particular problem.

## Instructors' backgrounds

**Wei Sun** is a Professor in the Biostatistics Program of Public Health Sciences Division at Fred Hutchinson Cancer Research Center. His major research interest is to develop statistical methods and software packages for -omic data studies. Most of the software packages developed by him and his trainees are available at <https://github.com/Sun-lab>. He has been working on gene expression quantitative trait loci

(eQTL) mapping, epigenetic data analysis, and cancer genomics. Currently he is working on a few projects using deep learning methods to analyze DNA sequence or RNA-seq data. He has taught several related classes in the past, including introduction to computational biology and statistical computing.

**Nancy R. Zhang** is Professor of Statistics in the Wharton School at the University of Pennsylvania. Her research is at the intersection of Statistics and Biology, and she develops methods motivated by data from high throughput genomic experiments. Within Statistics, her work includes theory and methods for change-point detection, scan statistics, false discovery rate control, and model and variable selection for high dimensional problems. Within genomics, she has worked in tumor genomics and single cell transcriptomics. Recently, she has developed deep learning paradigms for the analysis of single cell transcriptomic data. She has extensive teaching experience and is currently serving as the vice dean of Wharton Doctoral Programs.

## Career Development Workshop: Leveraging Mentorship

**Presenter:** Dr. Ruth Gotian

**Date:** Feb 7, 2022, 1 - 2 PM (EST)

**Registration:**

[https://us02web.zoom.us/WEBINAR/REGISTER/WN\\_CVGW1OQFRWQ07UEVGY-L-W](https://us02web.zoom.us/WEBINAR/REGISTER/WN_CVGW1OQFRWQ07UEVGY-L-W)

**Description:** The research is clear; those who are mentored outperform and outearn those who are not. Furthermore, 76% of people know they should have a mentor, but only 39% actually have one. Based on the popular mentoring articles in Forbes, Nature, and Harvard Business Review, participants will learn how to be an inspiring mentor and help propel their mentees to success. After this presentation on mentoring, participants will be able to:

1. Articulate the benefits of a mentoring team and pinpoint at least three people who should be on it.
2. Identify at least four methods of networking.
3. Understand the benefits of the mentor-sponsor continuum and develop multiple ways to amplify the voices of their mentees.
4. Summarize at least two ways to approach someone to be their mentor/mentee

Have questions for the speaker? Don't wait until the day of the event. Click [here](#) <https://app.sli.do/event/h0yjwqrz> to join as a participant and engage in the conversation! You can access the event's Q&A anytime before or during the event to ask or upvote questions you want to see answered.

### Presenter's background.

**Dr. Ruth Gotian** is Chief Learning Officer and Assistant Professor of Education in Anesthesiology and former Assistant Dean of Mentoring and Executive Director of the Mentoring Academy at Weill Cornell Medicine. She has been hailed by the journal Nature and Columbia University as an expert in mentorship and leadership development. In 2021, she was selected as one of 30 people worldwide to be named to the Thinkers50 Radar List, dubbed the Oscars of management thinking, and by August, was shortlisted as the top eight emerging management thinkers in the world. She is also a semi-finalist for the Forbes 50 Over 50 list. In addition to publishing in academic journals, she is a contributor to Forbes and Psychology Today where she writes about 'optimizing success'. Her research is about the mindset and skillset of peak performers, including Nobel laureates, astronauts, and Olympic champions. This work is featured in her book, The Success Factor.

# Call for Submission for Student Paper Award Competition

The Section on Statistics in Genomics and Genetics (SSGG) of the American Statistical Association is pleased to announce the 2022 Distinguished Student Paper Award Competition. Papers considered in this competition should contain methodological innovations and/or novel applications of statistical and computational methods to problems arising in genetics and genomics. Three to six awards will be given.

**Applicants for the SSGG Student Paper Award must meet all the following criteria at the time of submission:**

- Be a current undergraduate or graduate student at any level, or have received their degree in statistics, biostatistics, or related quantitative field in 2021.
- Be a current member of SSGG. The applicant can join SSGG at the time of submission. Instructions on how to join are provided below. Note that ASA membership does not automatically confer SSGG membership; ASA members must join individual sections in addition to generic membership.
- Be first author of the paper and scheduled to present the same paper submitted for the award at the 2022 JSM (currently scheduled to be held in Washington, DC) as either a talk, SPEED, or poster.
- Have submitted the paper to no more than one other ASA section 2022 student or early-stage investigator competition. (Note that in the event a paper wins two awards, the author may only accept one of the two awards)
- Have not previously won an SSGG student paper award.

**Applications should include:**

1. A cover letter including name, current affiliation

and status including actual or intended date of graduation, and contact information (address, telephone, e-mail) of the applicant.

2. The paper submitted for the competition which should be up to 25 pages (double-spaced, 1-inch margins) including an abstract and references, but not including figures and tables. Figures and tables should be placed at the end of the manuscript. No supplemental materials and appendices beyond the 25-page limit will be accepted. Papers do not need to be anonymized.

3. A letter from the advisor who should certify student status (or completion of degree within the past year), and in the case of joint first-authorship, should indicate the fraction of the applicant's contribution to the paper.

All materials must be received by the Section by **11:59 PM (Pacific Time) December 15, 2021**.

Winners will be notified by **January 15, 2022**.

Applications must be submitted by email (as separate PDF files). For further information or to apply, please contact Ni Zhao, Chair of the SSGG Distinguished Student Paper Award Committee [nzhao10@jhu.edu](mailto:nzhao10@jhu.edu) with "SSGG Distinguished Student Paper Award" in the subject line.

## Call for Topic-contributed Session Proposals

It is time to plan for your 2022 JSM, which will take place in Washington, District of Columbia, August 6-11, 2022.

**We support your submission!**

The Section of Statistics in Genomics and Genetics (SSGG) is a community of individuals interested in Statistical Genomics and Genetics within the American Statistical Association. The goals of the SSGG are to foster research, education and influence of statisticians on genomics and genetics and associated applications. We are now calling for topic-contributed session proposals. The theme for

JSM 2022 is “**Statistics: A Foundation for Innovation,**” but not all sessions have to adhere to this theme. Topic-contributed sessions include papers, panels, and posters:

- Topic-contributed paper sessions consist of five speakers, made up of at least three presenters and, at most, two discussants; each speaker has 20 minutes to present.
- Topic-contributed panels consist of three to six members providing commentary or a point of view on the panel topic.
- Topic-contributed poster sessions have 10–15 participants with posters addressing a common topic.

A topic-contributed session proposal includes a session title, general description of the session, list of participants, and tentative talk titles.

To propose a topic-contributed session:

- Develop your idea and a list of speakers who agree to present on a common topic.
- Submit your idea online from November 11 to December 9, 2021.
- Await approval from a member of the JSM Program Committee.
- Ensure all speakers submit individual abstracts by February 1, 2022, using the six-digit session ID. *Note: All speakers will be required to register for JSM prior to abstract submission.*
- Talk to potential authors early, as no participant can serve as a presenting author in more than one session.

We are supporting proposals broadly related to statistical genomics and genetics, computational biology, and relevant topics. To submit a session proposal to be considered for 2022 JSM, please read the instructions and guidelines at <https://ww2.amstat.org/meetings/jsm/2022/>. Be sure to check the SSGG as your first choice of sponsor. Submissions are open Nov 11 to Dec 9, 2021. We hope to see you in Washington, DC in the year 2022!

## Job Opportunities

- [Posted](#) 11.21.2021. Principal Biostatistician position - MSKCC. Details [here](#)
- [Posted](#) 11.9.2021. Research Associate Position - Colorado. Details [here](#) and [here](#)
- [Posted](#) 11.7.2021. A non-tenure track Assistant Professor position in Biostatistics. Details [here](#).
- [Posted](#) 11.4.2021. Postdoc position at Rutgers University. Details [here](#). Contact Dr. Vivian Li ([vivian.li@rutgers.edu](mailto:vivian.li@rutgers.edu))
- [Posted](#) 11.1.2021. Post-doctoral Fellowship in Colorado. contact [katerina.kechris@cu-anschutz.edu](mailto:katerina.kechris@cu-anschutz.edu) and [laura.saba@cuanschutz.edu](mailto:laura.saba@cuanschutz.edu)
- [Posted](#) 10.28.2021. Multiple Open Rank Tenure-Track/Tenured Faculty Positions in Statistics at George Mason University. Details [here](#). Contact Department Chair Prof. Jiayang Sun ([jsun21@gmu.edu](mailto:jsun21@gmu.edu))
- [Posted](#) 10.28.2021. A PostDoc Fellow Position at Mount Sinai. Details [here](#). Contact Dr. Xiaoyu Song [here](#)
- [Posted](#) 10.17.2021. Non-tenure-track Faculty Position - Division of Biostatistics, University of Minnesota
- [Posted](#) 10.17.2021. Multiple Tenure-track Assistant Professor Positions - Division of Biostatistics, University of Minnesota
- [Posted](#) 10.07.2021. Multiple Open-Rank and Open-Track Faculty Position(s) at the Department of Biostatistics, Columbia University.
- [Posted](#) 10.05.2021. Assistant/Associate Professor Positions in Data Science at Purdue University. Details [here](#).
- [Posted](#) 10.05.2021. Chair - Department of Biostatistics, University of Pittsburgh. Details [here](#).
- [Posted](#) 10.05.2021. Rutgers Cancer Institute of New Jersey Faculty Position Available- Biostatistics- Assistant to Associate Professor.
- [Posted](#) 10.05.2021. Tenure-track Faculty Positions at Purdue University – West Lafayette. Details [here](#).
- [Posted](#) 09.20.2021. Postdoc position in Department of Biostatistics and Informatics, Colorado School of Public Health. Details [here](#). Contact Dr. Debashis Ghosh [here](#)

## Join US

To become a SSGG section member, please first become an ASA member by signing up at <http://www.amstat.org/membership/becomeamember.cfm>. If you are already an ASA member, there are two ways you can become an SSGG section member: (1) call the ASA Headquarters at (703) 684-1221 and request the SSGG section be added to your membership or (2) renew your ASA membership online via the ASA member only website <https://www.amstat.org/membersonly/index.cfm> and add the "Section on Statistics in Genomics and Genetics" when you are asked to "verify your Publications, Chapters, and Sections, making any necessary additions or removals."

## Section Executive Committee

ASA SSGG Executive Committee		
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## Contact Us

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If you have something to share with our section or would like to contribute to our newsletters, please contact Ching-Ti Liu ([ctliu@bu.edu](mailto:ctliu@bu.edu)).

## Keep Connected

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