Communication Studies/Environmental Studies/Geology/Humanities/Meteorology (CEGHM) 168A,B: **Global Climate Change, Fall 2021-Spring 2022**

Graduate Reader:	Daniel Jacobson, Environmental Studies daniel.jacobson@sjsu.edu - **Please direct your class emails to Daniel FIRST**
Instructor:	Erica Ramsey Pulley, Communication Studies, erica.pulley@sjsu.edu Office Hours: TBD via Zoom (passcode: 916896)
Instructor:	Patrick Brown, Meteorology and Climate Science Office Hours: Monday- Friday by appointment, Please message me via Canvas (not email)
Instructor:	Costanza Rampini, Environmental Studies, costanza.rampini@sjsu.edu Office hours online by appointment.
Class Days/Time:	T/TH 10:45AM-1:30PM
Classroom:	Online
Prerequisites:	Passage of the Writing Skills Test (WST), upper-division standing, and completion of Core GE.
GE/SJSU Studies Category:	R, S, V

Course Format: Technology Intensive Online Course.

This course will meet twice weekly over Zoom, and a significant amount of work will take place online. At home high speed internet connection and a device with a camera that is compatible with Zoom is required. Computer and Internet access are required to access canvas, but laptops and computers are available for rent and use in the MLK Library (http://library.sjsu.edu/scs). See University Policy F13-2 at http://www.sjsu.edu/senate/docs/F13-2.pdf for more details.

Preparing for Zoom Classes

SJSU maintains a very good set of resources on the basics of how to use Zoom at https://www.sjsu.edu/ecampus/teaching-tools/zoom/. Please use these to get familiar with Zoom.

Do the following a couple of days before your first Zoom class:

1) Download the Zoom application onto the device you will be using to participate in class. Ideally, this should be a laptop, desktop, or tablet, and *not* a smartphone. Zoom does exist

for smartphones, but it will be very difficult to see the slides that your instructor presents on that small of a screen.

2) Familiarize with the steps you need to take to participate in Zoom classes. At minimum, know how to do the following:
   (a) log into Zoom
   (b) join a Zoom meeting
   (c) use the toolbar functions in Zoom (e.g., control your video and audio, mute and unmute yourself)
   (d) install the Zoom browser extension.

There are specific links to help with each of these things on the SJSU ECampus Zoom page linked above.

- For *lecture-style sessions*, the best way to participate is using "side by side mode", which will allow you to see the instructor's shared screen (e.g., Powerpoint slides) with a video feed of the instructor lecturing just above this. Side by side mode is something you need to enable as a student; your instructor cannot do this for you. Info on enabling side by side mode is here: https://support.zoom.us/hc/en-us/articles/115004802843-Side-by-Side-Mode-for-Screen-Sharing
- Zoom classes will be recorded and posted to Canvas.

Success in an Online Class

- Read the feedback in your assignment submission on Canvas!
- Set up your notification preferences and where you'd like to be contacted (by the first week of classes), this will ensure you receive timely messages about feedback, announcements, reminders, and other alerts.
- Navigate to your Canvas "Account" and personalize your contact information (Guides - How to set Profile and User Settings), and notification preferences (Guides - How to set Notification Preferences)
- You should have Canvas contact you immediately about announcements, grade alerts, and comments.

Recording Zoom Classes

This course or portions of this course (i.e., lectures, discussions, student presentations) will be recorded for instructional or educational purposes. The recordings will only be shared with students enrolled in the class through Canvas. The recordings will be deleted at the end of the semester. If, however, you would prefer to remain anonymous during these recordings, then please speak with the instructor about possible accommodations (e.g., temporarily turning off identifying information from the Zoom session, including student name and picture, prior to recording). Students are not allowed to record without instructor permission Students are prohibited from recording class activities (including class lectures, office hours, advising sessions, etc.), distributing class recordings, or posting class recordings. Materials created by the instructor for the course (syllabi, lectures and lecture notes, presentations, etc.) are copyrighted by the

instructor. This university policy (S12-7) is in place to protect the privacy of students in the course, as well as to maintain academic integrity through reducing the instances of cheating. Students who record, distribute, or post these materials will be referred to the Student Conduct and Ethical Development office. Unauthorized recording may violate university and state law. It is the responsibility of students that require special accommodations or assistive technology due to a disability to notify the instructor.

Course Description

Many different scientific observations and measurements indicate that Earth is experiencing global-scale changes in climate, i.e., in the long-term distributions of temperature, cloud cover, precipitation, and extreme weather events. Scientific consensus considers most of these changes to be caused or accelerated by human activities. The economic, ecological, social, and cultural challenges caused by global climate change will affect everyone on the planet, and are very likely to have disproportionate impacts on poorer nations and people. In this course, we will study global climate change from an interdisciplinary perspective, incorporating natural and social science approaches to understand its processes and effects. We will study the socioeconomic contexts of climate change impacts, and how globally diverse cultural perspectives influence strategies to mitigate and adapt to climate change.

A note about this course: This is a year-long course: 6 units (CEGHM 168A) in Fall and 3 units (CEGHM 168B) in Spring. **You must pass 168A with a grade of C or higher in order to enroll in 168B.** If you receive a grade of C- or lower in 168A, you will not be able to enroll in 168B. A grade of C- or lower in 168A/B will not earn any GE credit. You will receive credit for GE Areas R, S, and V after you have successfully completed the entire year-long sequence. **In order to receive GE credit, you must receive a grade of C or higher in both semesters.**

Team-Taught Course: This course is unique because it is team-taught. We meet for extended class periods. We will cover *a lot* of material on numerous topics and engage in various activities related to global climate change and the SJSU Studies GE learning objectives. Assignments, readings, class activities and discussions are designed to help you recognize connections among concepts from many different disciplines, and to critically evaluate and integrate them as part of a life-long learning process about global climate change and related issues. This course will help students to develop abilities to address complex issues using disciplined analytical skills and creative techniques.

Course Goals and Student Learning Objectives

Learning objectives are developed to assist students in understanding the main goals and expectations of the course. Teaching and learning activities are designed with these objectives in mind while assessment activities help us measure student achievement of these objectives. This course will incorporate writing assignments throughout the two semesters, and will meet the requisite **9,000 words** required of the three SJSU Studies areas. Some written assignments will be adaptable to students' specific disciplines.

Assessment is designed to determine how well students have achieved the goals of the learning objectives and thus form an important component of the course. Each student will be assessed through a combination of writing assignments, exams, and course projects. Each assignment is linked to the student learning objectives (SLO) noted below (ex: Riii). Students will complete diagnostic, midterm, and summative

assessment rubrics each semester in addition to written reflection and evaluation of their own work.

Success in this course is based on the expectation that students will spend, **for each unit of credit, a minimum of forty-five hours over the length of the course (normally 3 hours per unit per week with 1 of the hours used for lecture)** for instruction or preparation/studying or course related activities including but not limited to internships, labs, clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

The Area R (Earth and Environment) General Education learning objectives are:

- A student should be able to demonstrate an understanding of the methods and limits of scientific investigation.
- A student should be able to distinguish science from pseudoscience.
- A student should be able to apply a scientific approach to answer questions about the earth and environment.

R: The specific learning objectives in this area for this course are:

i. A student should be able to demonstrate an understanding of the fundamental processes responsible for past and present climate change.
ii. A student should be able to distinguish valid scientific debates with biased propaganda.
iii. A student should be able to design quantified personal and community scale climate change solutions.

The Area S (Self, Society & Equality in the U.S.) General Education learning objectives are:

- To be able to describe how identities (i.e. religious, gender, ethnic, racial, class, sexual orientation, disability, and/or age) are shaped by cultural and societal influences within contexts of equality and inequality.
- To be able to describe historical, social, political, and economic processes producing diversity, equality, and structured inequalities in the U.S.
- To be able to describe social actions which have led to greater equality and social justice in the U.S. (i.e. religious, gender, ethnic, racial, class, sexual orientation, disability, and/or age).
- To recognize and appreciate constructive interactions between people from different cultural, racial, and ethnic groups within the U.S.

S: The specific learning objectives in this area for this course are:

i. To be able to describe how cultural and societal effects of climate change shape the identities of individuals and communities.
ii. To be able to describe the processes of the fossil fuel economy that creates structured inequalities in the United States.
iii. To be able to identify climate change mitigation strategies and describe actions that can lead to environmental justice in the U.S.
iv. To recognize and appreciate constructive interactions between people from different cultural, racial, and ethnic groups in the U.S., and to apply this knowledge to conduct a community needs assessment and develop a community outreach strategy regarding climate change.

The Area V (Culture, Civilization & Global Understanding) General Education learning objectives are:

- To be able to systematically compare the ideas, values, images, cultural artifacts, economic structures,

technological developments, and/or attitudes of people from more than one culture outside the U.S.

- To be able to identify the historical context of ideas and cultural traditions outside the U.S. and how they have influenced American culture.
- To be able to explain how a culture outside the U.S. has changed in response to internal and external pressures.

V. The specific learning objectives in this area for this course are:

i. To be able to compare international policy responses and cultural perceptions of climate change.
ii. To be able to compare policy mechanisms, economic development patterns, and governance structures that influence national and cultural responses toward international efforts to mitigate adverse impacts of climate change.
iii. To be able to identify how international policy actions are affected by historical, cultural, and economic contexts of developed and developing countries, with emphasis on how international cultural perspectives affect the United States' response.
iv. To be able to explain how the cultures of developing countries have responded to international negotiations of climate change.

Team SJSU Studies Integrated Learning Goals

Team SJSU course sequences include GE Areas R, S, and V and are structured to foster integrative learning in a rich multi-disciplinary academic environment. Students should develop an understanding that builds across the curriculum (and co-curriculum), from making simple connections among ideas and experiences to synthesizing and transferring learning to new, complex situations within and beyond the campus. Students will develop habits of intentional learning through reflection and self-assessment.
Students shall be able to:

1. Demonstrate understanding of the connection of academic knowledge to experiences outside the classroom;
2. Demonstrate understanding of the connection of knowledge from two or more fields of study or disciplinary perspectives by independently relating examples, facts, or theories;
3. Adapt and apply, independently, skills, abilities, theories, or methodologies gained in one situation to new situations to solve problems or explore issues, ideally in original ways;
4. Communicate integrative understanding in ways that enhance the presentation of the connections between/among information from different domains of knowledge.

Required Texts/Readings

Required: Boycoff, M. (2019). *Creative (climate) communications: Productive pathways for science, policy, and society*. Cambridge: Cambridge University Press.

Other readings and viewings will be assigned and available via the class Canvas website. Please skip to the end of this document to see a complete list of readings for the class. It is your responsibility to know what assignments are due when, and to complete them on time.

Clickers

We will be using **iClicker/REEF Polling** as a student response system in class this term. This software helps us to understand what you know and gives everyone a chance to participate in class.

You will have several options available to participate in clicker sessions, all options are available to you at NO COST. **iClicker/REEF Polling** allows you to use your smartphone, tablet or laptop as a clicker to participate. On your smartphone or tablet go to Mac App Store or Google Play and download *Reef Polling by iClicker* If using a laptop, go to https://app.reef-education.com/#/login.

Classroom Protocol

* Students are expected to attend every class, as this is a participation-intensive course that relies on your consistent and active engagement. Classroom activities will often be assigned and collected during class, and there are no ways to make up this work.

* Assignments will not be accepted late, except with a valid excuse. Late work will be marked down **20% per day (including weekends)**, and will receive a zero if turned in one week or more after the due date.

* We will regularly use the course's Canvas course site: http://sjsu.instructure.com for announcements, readings, assignments, uploads of instructor presentations. You are responsible for setting up Canvas so you are notified when we have posted an announcement or assignments. To locate your Canvas login name and password, follow the instructions posted here: http://www.sjsu.edu/at/ec/canvas/index.html.

* Personal electronic devices: Outside of their use for classroom activities and for iClicker responses, the use of personal electronic devices are not allowed. Their use is distracting to other students, and may compromise the educational value of the classroom experience that all students pay for.

* Cell phones and all instant-messaging programs must be turned off prior to class. NO text messaging or phone use is permitted in the classroom and laptops may only be used for class purposes. This will be strictly enforced.

* Common courtesy and professional behavior dictate that you notify someone when you are recording them. You must obtain the instructor's permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.
* Course material developed by the instructors is the intellectual property of the respective instructor and cannot be shared publicly without their approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.
* Email to a professor should be treated like a business letter. Please follow these tips when emailing your professor: http://web.wellesley.edu/SocialComputing/Netiquette/netiquetteprofessor.html. Emails that do not follow this "netiquette" will not receive a response.

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc., and should be aware of the deadlines and penalties for dropping classes.

Refer to the current semester's Catalog Policies at: http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic calendar web page located at http://www.sjsu.edu/academic_programs/calendars/academic_calendar/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/. Information about the latest changes is available at the Advising Hub at http://www.sjsu.edu/advising/.

Assignments and Grading Policy

There will be spontaneous in-class writing activities throughout the course, which all students are expected to complete as part of the revision and feedback process of larger writing assignments.

Letter grades will be assigned according to the following point scale:

A	92.5 to 100	B-	79.5 to 82.4	D+	66.5 to 69.4
A-	89.5 to 92.4	C+	76.5 to 79.4	D	62.5 to 66.4
B+	86.5 to 8.4	C	72.5 to 76.4	D-	59.5 to 62.4
B	82.5 to 86.4	C-	69.5 to 72.4	F	0 to 59.4

FALL ASSIGNMENTS

Short Paper #1 (Pulley) 15%. 500 words draft; 250 words peer review; 1000 words final paper (SLO: Si). We live in a heavily mediated society, which influences our thoughts, behaviours, preferences, beliefs, relationships, and activities. Keeping that in mind, reflect on the media you grew up consuming (news, video games, cartoons, vloggers, social media, movies, TV shows, podcasts, music, etc…) and think about how that has influenced your understanding—or lack thereof—of climate change and its myriad intersecting issues. Identify one of these media sources and be prepared to write about its impact on you, your friends, family, community, and society at large by applying concepts discussed in class and covered in your readings. More details will be posted on Canvas and discussed during class when the paper is assigned.

Short Paper #2 (Brown): 15%. 1000 words (SLO: Ri, Riii, Siii) You will have a chance to work with the En-ROADS simulation model (developed by Climate Interactive and MIT Sloan Sustainability Initiative) to create a set of policies that enacted together can reduce future global warming. You can choose to reduce global warming to the internationally agreed target of less than 2°C (3.6°F) or you can choose a more or less ambitious target (either way you must justify your choice in terms of costs and benefits).

Climate Advocacy Project: 10%, 1200 words. The goal of your Climate Advocacy Project (CAP) is to implement a public engagement campaign focused on one of the drivers OR impacts of climate change. You will develop and launch your own evidence-informed climate campaign to try to influence people, institutions or laws.

1. Project Proposal: 75 points, 500 words (SLO: Si, Siii, Siv, Riii). As a group, you will write a proposal for your CAP project explaining the cause/solution that you will tackle, your campaigns goals and action plan, and your intended audience. *A detailed assignment sheet will be shared on canvas*.
2. Revised Proposal: 100 points, 700 words (SLO: Si, Siii, Siv, Riii). Based on the feedback received on your proposal, your CAP group will submit a revised and detailed proposal for your CAP project that addresses the various concerns raised by your instructors. *A detailed assignment sheet will be shared*

on canvas.

Participation and Activities: 25%. 1000 words; (SLO: Si-iv, Ri-iii, Vi-iv). Participation will be evaluated by your engagement in class discussions and activities. Student participation will be evaluated during and after class by, amongst other things, using iClicker and grading write-ups submitted in response to discussion prompts. *Detail guidelines will be provided during class each time*.

Exam #1: 10%. 500 words (SLO: Si-iv, Ri-iii, Vi-iv). Exams test the students' understanding of class materials, including lectures and readings, and consist of a mix of multiple choice and short answer questions.

Exam #2: 10%. 500 words (SLO: Si-iv, Ri-iii, Vi-iv). Exams test the students' understanding of class materials, including lectures and readings, and consist of a mix of multiple choice and short answer questions.

Exam #3: (Final): 15%. 500 words (SLO: Si-iv, Ri-iii, Vi-iv). Exams test the students' understanding of class materials, including lectures and readings, and consist of a mix of multiple choice and short answer questions.

SPRING ASSIGNMENTS

Short Paper #3: 15%. 500 words draft; 300 words peer review; 750 words final paper (SLO: Riii, Siii, Vi-iv). Write a letter to one of your federal representatives urging them to take climate action and reduce greenhouse gas emissions. In your letter you should explain why you think climate change is an important issue, using specific and concrete examples, why it is key that the United Sates reduce its own emissions as a country and lead international efforts to transition to renewable energy sources, and discuss the co-benefits of climate change mitigation efforts. *A detailed assignment sheet and grading rubric will be discussed in class.*

Climate Advocacy Project: 35%. 2000 words; (SLO: Si-iv, Ri-iii, Vi-iv). You will work with a group of your peers to engage a specific audience (policymakers, community members, etc.) on some aspect of climate change. As a group, you will submit a public service announcement and accompanying script (500 words), a final report (1500 words), and a final presentation that will be judged by your peers, and an external panel of judges who will award prizes to the winning teams. Your final CAP grade will be a combination of individual and group grades.

Participation, In-class and Online Activities 20%. 1000 words; (SLO: Si-iv, Ri-iii, Vi-iv). Participation will be evaluated by your engagement in class discussions and activities. Student participation will be evaluated during and after class by, amongst other things, using iClicker and grading write-ups submitted in response to discussion prompts. *Detail guidelines will be provided during class each time*.

Exams 1 & 2: 15% each; 500 words each. (SLO: Si-iv, Ri-iii, Vi-iv). Exams test the students' understanding of class materials, including lectures and readings, and consist of a mix of multiple choice and short answer questions.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/"

CEGHM 168 A, Fall 2021 - Course Schedule

This schedule may be amended, with fair notice, to accommodate guest lectures & current events.

TH Aug 19
Intro to Course
Realities of Managing Climate Change (CR)

TU Aug 24
Climate Science Overview (PB)
Land Use and Climate Change (CR)

TH Aug 26
Overview: What is Climate Change Communication and Why Does It Matter? (ERP)
Influence of Climate Change on Non-Human Species (CR)

TU Aug 31
The four causes of CO2 emissions (Kaya) (PB)
"One Degree Factor" (movie and quiz) (CR)

TH Sept 2
Paper #1 Assigned
Introduction to *Environmental* Communication (ERP)
Climate change vulnerability (CR)

TU Sept 7
Carbon and the carbon cycle, How are humans affecting the carbon cycle? (PB)
The Challenges of Climate Change Communication (ERP)

TH Sept 9
Submit paper #1 draft
Peer Review Workshop for Paper #1 (ERP)
Temperature, Energy Budget and Greenhouse Effect (PB)

TU Sept 14
Radiative Forcings and the human contribution to global warming (PB)
Climate change in the Himalayas (CR)

TH Sept 16
Observational Evidence of Warming (PB)
Climate & Media (ERP)

TU Sept 21
Introduction to Mitigation (CR) - **Paper #1 Peer Review Due**
Misinformation & Disinformation in the Post-Truth Era (ERP)

TH Sept 23
Summary of why we think humans are warming the climate (PB)
Exam #1 Review

TU Sept 28
Exam #1

TH Sept 30
Climate Change & Christinatiy (CR)
Weather & Climate Extremes: Wildfire (PB)

TU Oct 5
Introduction to Climate Advocacy Project (CAP) & Group Formation

TH Oct 7
Merchants of Doubt (movie) + quiz & online discussion (CR) - **Paper #1 Due**

TU Oct 12
En-Roads and Paper 2 (PB)
Guest Lecture by Dr. Amanda Stasiewicz

TH Oct 14
Tipping Points in the Climate System (PB)
California & Climate Change (CR)

TU Oct 19
Weather & Climate Extremes: Temperature (PB)
TBD (ERP)

TH Oct 21
Weather & Climate Extremes: Tropical Cyclones (PB)
Climate Advocacy Project - Local Organizations (CR)

TU Oct 26
Introduction to Climate Change Adaptation (CR)
Exam #2 Review

TH Oct 28
Exam #2

TU Nov 2
Adapting Agriculture (CR)
Communication Theories (ERP)

TH Nov 4
Adapting Cities (CR)
Guest Lecture by Dr. Kevon Rhiney

TU Nov 9
Paper #2 Due
Climate Advocacy Project - Topic Selection
Theories of Persuasion (ERP)

TU Nov 16
Adapting conservation (CR)
Weather & Climate Extremes: Heavy Precipitation / Floods (PB)

TH Nov 18
What is Climate Justice? Communicating for & about Climate Justice (ERP)
Weather & Climate Extremes: Droughts (PB)
CAP Proposals due on Canvas at 11:59pm

TU Nov 23
An Inconvenient Sequel (movie & quiz) (PB)

TH Nov 25 **Thanksgiving: No Class**

TU Nov 30
Climate Change Career Panel
Climate Advocacy Project - Revising CAP Proposal

TH Dec 2
Wrap-up & Catch-up
Final Exam Review
CAP Revised Proposals due on Canvas on Tuesday, December 7th at 11:59pm

Final Exam: Thursday, Dec 9, 2021, 9:45AM-12:00PM

List of Readings for 168A

These articles will be used to supplement readings from the book listed in the syllabus.
Readings may be amended, with fair notice, to accommodate guest lectures & current events.

For Professor Brown:

Intergovernmental Panel on Climate Change (IPCC) Assessment Report 4 (2007) Frequently Asked Questions (FAQs) [link]

Intergovernmental Panel on Climate Change (IPCC) Assessment Report 5 (2013) Frequently Asked Questions (FAQs) [link]

Intergovernmental Panel on Climate Change (IPCC) Assessment Report 6 (2021) Frequently Asked Questions (FAQs) [link]

For Professor Rampini:

Boucher, D., Elias, P. Mulik, K. and E. Davis. (2013) Climate-friendly land use: Paths and policies toward a less wasteful planet. Tropical Forest and Climate Initiative of the Union of Concerned Scientists. Retrieved from https://www.ucsusa.org/sites/default/files/2019-09/Climate-Friendly-Land-Use.pdf

Heikkinen, NB. (2016) Genetically engineered crops are safe and possibly good for climate change. Scientific American reprinted from ClimateWire. Retrieved from https://www.scientificamerican.com/article/genetically-engineered-crops-are-safe-and-possibly-good-for-climate-change/

Howard, B.C. (2014). 5 threats to California from Climate Change. National Geographic. Retrieved from https://www.nationalgeographic.com/science/article/140812-california-climate-change-global-warming-science

Jones, H.P., Hole, D.G., & Zavaleta, E. S. (2012). Harnessing nature to help people adapt to climate change. *Nature Climate Change*, 2, 504-509.

Kasperson R.E. and J.X. Kasperson, 1991. "Hidden Hazards" in *Acceptable Evidence: Science and Values in Risk Management*. Eds. D.G. Mayo, D. G. and R.D. Hollander. Oxford UP.

Koop, F. (2018). California's climate leadership contradiction. China Dialogue. Retrieved from https://chinadialogue.net/en/climate/10817-california-s-climate-leadership-contradiction/

Pielke, R., Prins, G., Rayner, S. and D. Sarewitz. (20076) Lifting the taboo on adaptation. *Nature* 445, 597-598.

Rosenzweig, C., Solecki, W., Hammer, S.A., and S. Mehrotra. (2010). Cities lead the way in climate-change action. *Nature* 467: 909-911.

Walker, B. (2019). Hindu Kush Himalayas set formassive biodiversity loss. Thethirdpole.net. Retrieved from https://chinadialogue.net/en/climate/11103-hindu-kush-himalayas-set-for-massive-biodiversity-loss/

Xu J., R. E. Grumbine and A. Shrestha. (2009). The melting Himalayas: Cascading effects of climate change on water, biodiversity, and livelihoods." *Conservation Biology* 23 (3), 520-30.

Zaleha, B.D. and A. Szasz. (2015). Why conservative Christians don't believe in climate change. *Bulletin of the Atomic Scientists* 71(5): 19–30.