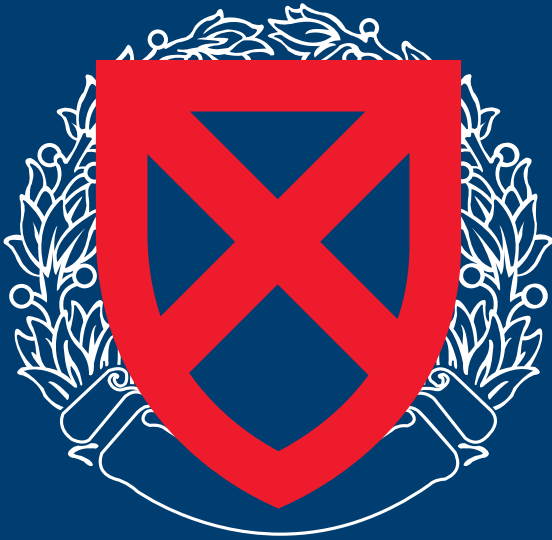


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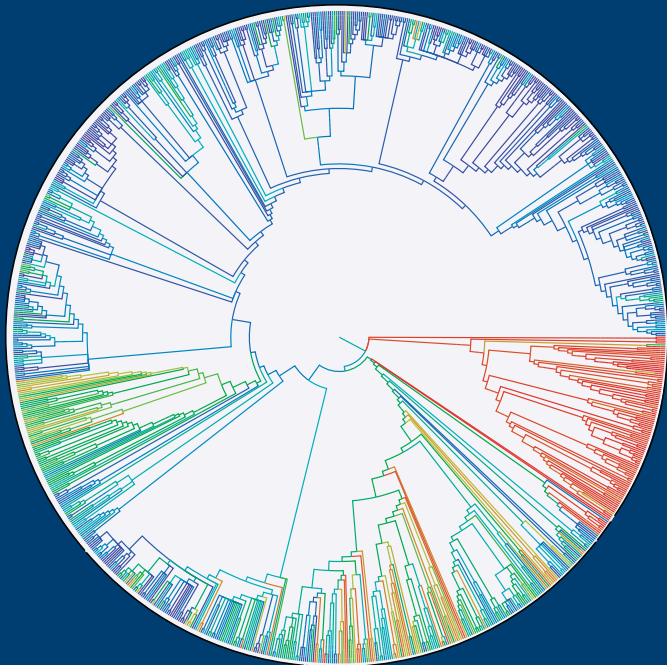
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The Privileged Poor

Anthony Abraham Jack
in conversation with Danielle Allen



Building, Exploring, and Using the Tree of Life

Douglas E. Soltis and Pamela S. Soltis

ALSO: An International Anti-Corruption Court
Dædalus Explores Why Jazz Still Matters
Rediscovering Humanities Education in Community Colleges

Upcoming Events

MAY

20th

Loews Vanderbilt Hotel
Nashville, TN
Member Breakfast

JUNE

3rd

The Century Association
New York, NY
New Member Reception

Featuring: **David Oxtoby** (American Academy) and **Annette Gordon-Reed** (Harvard University; Harvard Law School; Radcliffe Institute for Advanced Study)

5th

University of California, Santa Barbara
Santa Barbara, CA
Member Reception

Featuring: **David Oxtoby** (American Academy)

10th

Carnegie Institution for Science
Washington, D.C.

Lessons from the Clean Air Act: Building Durability and Adaptability into U.S. Climate and Energy Policy

Featuring: **Ann E. Carlson** (University of California, Los Angeles School of Law) and **Dallas Burtraw** (Resources for the Future)

11th

The British Academy
London, United Kingdom

Member Reception and Presentation of the 2018 Sarton Prize for History of Science

Featuring: **David Oxtoby** (American Academy) and Sarton Prize winner **Jenny Bulstrode** (University of Cambridge)

For updates and additions to the calendar, visit www.amacad.org.

From the President



David W. Oxtoby

This issue of the *Bulletin* highlights the remarkable breadth of the Academy's work, describing recent activities in the areas of education, science, international affairs, and the arts. The work detailed in these pages also demonstrates our commitment to core values: elevating the use of evidence and knowledge, embracing diversity and inclusion, and advancing the common good.

Connected to the Academy's recent Commission on the Future of Undergraduate Education, in February we were delighted to host the launch of sociologist Anthony Jack's first book, *The Privileged Poor: How Elite Colleges are Failing Disadvantaged Students*, which discusses the experiences of low-income undergraduate students at elite institutions. Jack's research reinforces one of the key ideas of the Commission's work: making sure that all students receive the academic, social, emotional, and financial support that will enable them to complete their degrees and pursue successful lives and careers. Anthony Jack's presentation and his conversation with Danielle Allen are featured in this issue.

The Humanities Indicators, a long-term project of the Academy, provides data on an array of topics pertaining to the role of the humanities in the contemporary United States. The Humanities Indicators recently surveyed the nation's community colleges, and the results, highlighted in this *Bulletin* issue, demonstrate the vast scale of the enterprise, with approximately 2.8 million students enrolled in humanities courses and 70,000 faculty members teaching these courses at community colleges.

The Academy's project on the Public Face of Science has been exploring the complex and evolving relationship between scientists and the public. In March, we were pleased to host a meeting that featured two prominent scientists, Douglas and Pamela Soltis, both Academy members, who described their work on the "Tree of Life," which is being used to explain evolution and genealogical relationships. In collaboration with scientists worldwide, Doug and Pam Soltis have worked to harness algorithm development, computer power, and DNA sequencing to produce a comprehensive "tree" of all 2.3 million named species. Their presentations, included in this *Bulletin* issue, illustrate the importance of engaging the public on scientific issues, and of the value of integrating science and the arts to improve public understanding. They followed a long-standing focus of the Academy on evolution, dating back to an 1860 debate about Darwin's "Origin of Species" between two Academy members: the noted botanist Asa Gray (defending Darwin's theory) and Harvard biologist and geologist Louis Agassiz (rejecting evolutionary theory).

In addition to our projects in education, the humanities, and science, a recent meeting about the prospects for an International Anti-Corruption Court and the publication of our Spring *Dædalus* issue, "Why Jazz Still Matters," are further examples of the wide range of work the Academy undertakes.

We welcome your active involvement in pursuing the Academy's mission "to cultivate every art and science which may tend to advance the interest, honor, dignity, and happiness of a free, independent, and virtuous people." I look forward to working with you to advance these important goals.

David W. Oxtoby

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An International Anti-Corruption Court

By Brendan Roach and Erik Mortensen

The American Academy of Arts and Sciences hosted a distinguished group of judges, attorneys, human rights specialists, and academics on March 20, 2019, to discuss whether an International Anti-Corruption Court (IACC) would contribute to global peace and security and, if so, how it might be established.

Robert Rotberg (President Emeritus of the World Peace Foundation, Founding Director of the Program on Intrastate Conflict at the Harvard Kennedy School, and guest editor of the *Dædalus* issue on “Anticorruption: How to Beat Back Political & Corporate Graft”) organized the meeting and led the conversation. He was joined by Judge Mark Wolf of the United States District Court for the District of Massachusetts and Justice Richard Goldstone, formerly of the Constitutional Court of South Africa and Chief Prosecutor at the initial United Nations International Criminal Tribunal for the former Yugoslavia.

The discussion expanded upon an essay written by Judge Wolf, published in the *Dædalus* issue on “Anticorruption,” that argued for the establishment of an International Anti-Corruption Court to investigate and prosecute cases of high-level corruption. Judge Wolf initially proposed the idea of such a court in a 2014 paper published by the Brookings Institution. Since then, the concept has been endorsed by Nobel Peace Prize winner and former Colombian President Juan Manuel Santos and current Colombian President Ivan Duque Marquez, as well as other former elected and appointed officials around the globe.

In his opening remarks, Professor Rotberg posed a series of questions to structure the discussion:

1. Would the IACC contribute positively to efforts to fight corruption?
2. What should its powers be?
3. What would distinguish the IACC from the existing International Criminal Court (ICC)?
4. How could the IACC be brought into existence?

Corruption and International Jurisprudence

Justice Goldstone noted that corruption is a systemic problem. Typically, corrupt politicians are abetting other compromised institutions, such as the judiciary, police, and prosecutorial offices, thereby making domestic prosecution ineffective. A supranational, neutral institution could serve as a venue of last resort to hold officials in these countries to account and to enforce internationally recognized protocols against corruption.

Using the International Criminal Court as an example, Justice Goldstone said that although its creation initially met with skepticism, the Rome Statute currently has 138 signatories and 123 parties. There have been two withdrawals – Burundi and the

Philippines – primarily because their elected leaders fear ICC prosecution. This dynamic points to a potentially adverse selection problem in establishing the IACC, as the most corrupt countries would also be those least likely to participate.

Outside of its prosecutorial successes, the ICC has helped to introduce the lexicon of war crimes into discussions among political and military leaders, journalists, and whistleblowers by providing an impartial forum for the adjudication of such issues. In addition, those nations that joined would make laundered funds brought into their nations subject to freezing orders and appropriate transfers of those illicit funds.

Justice Goldstone suggested that the ICC should serve as inspiration to proponents of the IACC. He observed that the ICC drew many doubters and detractors before its creation. However, over the last nearly two decades, the ICC has attracted over 120 members and helped to put human rights at the forefront of both international and domestic agendas.

Strong Argument

The participants agreed that even if a new IACC lacked P3 support, which was likely, its sheer existence would be important, signaling to the other 190 nations that world order took kleptocratic corruption seriously enough to create a new international jurisdictional body to bring grand corrupters to book. Fragile or weak states, where there is much routine grand corruption, would take notice. Changing the tone of global concerns about corruption would hence prove a major contribution, and reason enough for a new court.

Joseph S. Nye, University Distinguished Service Professor at Harvard University and former Dean of the Harvard Kennedy School, said that the Court could be successful even if only a small proportion of UN Member States were parties to it. He claimed that he would rather see twelve well-chosen countries join the IACC than all 190 nations.

Proposed Jurisdiction

As proposed, the IACC would have the authority to prosecute instances of grand corruption by high-level political leadership. Just as nations that are signatories to the ICC are subject to its jurisdiction, so too would signatories to the IACC allow the Court to serve

as a venue of last resort for violations of the United Nations Convention Against Corruption (UNCAC). The Court would be empowered only to bring charges when a signatory to the UNCAC did not make a good faith effort to bring charges.

Participants discussed how cases would be brought to the Court for adjudication. One proposal was to allow individuals to submit complaints, empowering civil society groups in corrupt political environments to hold officials to account.

Concerns

Attendees raised some concerns about the creation of an IACC. Perhaps the most important concern was a lack of buy-in from major global powers like Russia, China, and the United States. Other participants disagreed whether the absence of the United States would damage the IACC's credibility; the absence of American influence may even assuage concerns about the Court advancing American interests instead of pursuing fair adjudication. However, the lack of American participation could be a missed opportunity at addressing "soft" corruption issues in U.S. politics, such as campaign finance and industry lobbying for greater deregulation. Some attendees argued that Russia, at least, may be interested in joining the IACC to lend credibility to its anti-corruption efforts. Furthermore, the IACC would likely have jurisdiction over common financial intermediaries such as Switzerland and the Cayman Islands, giving international prosecutors a channel to confiscate the gains of corrupt officials, regardless of whether they were citizens of an IACC signatory.

The topic of "soft" corruption elicited a few concerns from the participants. In many political cultures, traditions of reciprocity could run afoul of accepted legal norms governing corruption. In these instances, participants expressed apprehension that the IACC might disproportionately target offenses in the global South. Indeed, a similar criticism has been leveled against the ICC.

Building Legitimacy

The participants discussed how the IACC could be brought into existence. Successfully establishing the IACC would require concerted effort to establish its legitimacy as an impartial and competent juridical body. Several suggestions emerged from the discussion.

Justice Goldstone emphasized that experienced, capable, and inventive prosecutors were essential if a new court was to succeed.

Another major theme was the importance of choosing partners carefully. Including representatives of corrupt regimes would diminish the credibility of any resulting court; participants proposed

identifying allies in civil society to incorporate perspectives from countries in which corruption is a major concern. Building such ties would allow the IACC to identify strong cases for prosecution and weaken the ability of corrupt regimes to use the Court for bad-faith investigations of political opponents.

Transparency-focused nongovernmental organizations could advise the IACC in selecting its initial cases. The experience with the ICC is instructive: the Court's first case, a prosecution of the Lord's Resistance Army in Uganda, faced charges of hypocrisy because the Ugandan government, which worked with the ICC to bring the case, was alleged to have committed similar offenses. Participants at the workshop suggested that for its first cases, the IACC ought to focus on countries in which grand corruption by high-level leaders is rampant, prosecution efforts have not materialized, and a democratic civil society is eager to hold governments to account. Such countries include, *inter alia*, Ukraine, Paraguay, and the former Soviet republics in Central Asia.

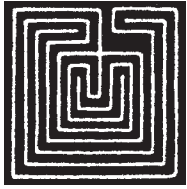
Next Steps

With the active support of the Colombian government, momentum is growing to bring the International Anti-Corruption Court concept before international bodies, including the United Nations General Assembly. Indeed, the governments of Colombia, Peru, and Nigeria have formally endorsed a General Assembly session on corruption, tentatively scheduled for 2021. Though the process of drafting and ratifying international conventions can be slow, participants encouraged the development of regional or continental agreements to target corruption. Such agreements could serve as a proof of concept for an international body, while addressing ongoing issues of corruption as the details of the IACC are negotiated.

Participants identified several countries, such as Canada and South Africa, as likely to lend credibility to the IACC, and suggested that diplomats and attorneys from these countries be invited into the drafting process. The drafting of the Rome Statute of the International Criminal Court could provide useful lessons in structuring the international partnerships and diplomatic backchannels necessary to create a working draft for the consideration of the United Nations.

Justice Goldstone believes that the Crimes Against Humanity Convention would be a helpful starting point in terms of structure and substance. ■

Brendan Roach is the Morton L. Mandel Presidential Fellow at the American Academy of Arts and Sciences. Erik Mortensen is Clerk to the Honorable Mark Wolf, United States District Court for the District of Massachusetts.



Dædalus Explores Why Jazz Still Matters

Jazz: it has been called both cool and hot, earthy and avant-garde, intellectual and primitive. It is improvisational music touted for the freedom it permits its players, but in its heyday was largely composed and tightly arranged. It tells a story about race in America: not only because African American musicians were so central in its creation and African American audiences so important in their creative responses to it, but because whites played such a dominant role in its dissemination through records and performance venues and its ownership as intellectual and artistic property. But is jazz a relic of the past, or does it continue to have meaning and influence for today's artists and audiences? And while it may still be *present*, does it still *matter*?

The Spring 2019 issue of *Dædalus*, "Why Jazz Still Matters," explores that very question. Gathering together noted writers, artists, and scholars to delve into the legacies and futures of jazz, guest editors Gerald Early (Washington University in St. Louis) and Ingrid Monson (Harvard University) maintain that it does still matter, in ways that are astonishing in their implications. Contemporary jazz artists like Kamasi Washington and Robert Glasper, collaborating with avant hip hop artists like Kendrick Lamar and Run

the Jewels, are forging new sounds and reaching young and diverse audiences. The music also continues to engage with social movements, such as Black Lives Matter, and inspire socially engaged artistic expression in jazz (such as Terence Blanchard's *Breathless*) and popular music (Beyoncé's *Lemonade*) modeled on an artistic vision of jazz. Jazz improvisation, meanwhile, remains a compelling metaphor for interrelationship, group creativity, and freedom that is both aesthetic and social.



Guitarist George Benson performs at the 2013 Monterey Jazz Festival. © 2013 by the Monterey Jazz Festival/Cole Thompson.

The ten essays in this volume critically examine the achievements of jazz as an artistic movement through historical case studies, engagement with contemporary jazz innovations, and projections of the art form's future. The interdisciplinarity of the contributors emphasizes the fact that jazz was never only a music, but rather a music that served as a muse for an entire arts movement.

Academy Members may access an electronic copy of this *Dædalus* issue by logging into the Academy's website at www.amacad.org and visiting the Members page. For more information about *Dædalus*, please visit www.amacad.org/daedalus or contact daedalus@amacad.org. ■

"Why Jazz Still Matters" Spring 2019 issue of *Dædalus*

Why Jazz Still Matters by **Gerald Early** (Washington University in St. Louis) & **Ingrid Monson** (Harvard University)

Following Geri's Lead by **Farah Jasmine Griffin** (Columbia University)

Soul, Afrofuturism & the Timeliness of Contemporary Jazz Fusions by **Gabriel Solis** (University of Illinois at Urbana-Champaign)

"You Can't Dance to It": Jazz Music and Its Choreographies of Listening by **Christopher J. Wells** (Arizona State University)

Dave Brubeck's Southern Strategy by **Kelsey A. K. Klotz** (University of North Carolina at Charlotte)

Keith Jarrett, Miscegenation & the Rise of the European Sensibility in Jazz in the 1970s by **Gerald Early** (Washington University in St. Louis)

Ella Fitzgerald & "I Can't Stop Loving You," Berlin 1968: Paying Homage to & Signifying on Soul Music by **Judith Tick** (Northeastern University)

La La Land Is a Hit, but Is It Good for Jazz? by **Krin Gabbard** (Columbia University)

Yusef Lateef's Autopsiopsychic Quest by **Ingrid Monson** (Harvard University)

Why Jazz? South Africa 2019 by **Carol A. Muller** (University of Pennsylvania)

Rediscovering Humanities Education in Community Colleges

By Robert B. Townsend

Much of the attention about the humanities in higher education tends to focus on four-year colleges and universities (and more specifically, on the declining number of students who major in the humanities). In recent years, the American Academy's Humanities Indicators (HI) have been exploring the growing presence of the humanities in the community college sector. To capture the scale and character of humanities education at these institutions, the HI (with funding from the National Endowment for the Humanities) surveyed the nation's community colleges on three key topics:

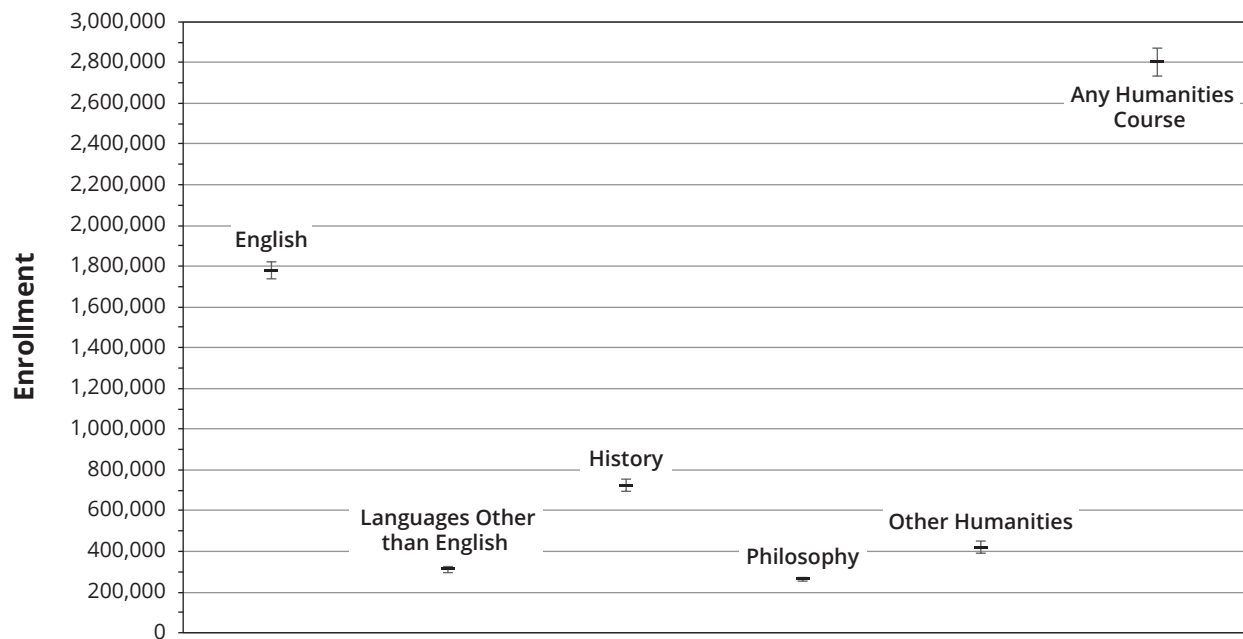
1. The number and share of students taking humanities courses;
2. The number and share of faculty teaching such courses; and
3. The number and share of students who earn college credit in the humanities while still enrolled in high school.

The findings underscore the significant presence of the humanities in community colleges and reveal some of the variations in humanities course-taking in this sector.

Students Taking Humanities Courses

One of the key goals of the survey was to determine how many students in community colleges are touched by the humanities. While an earlier HI study demonstrated that over 350,000 students earned associate's degrees in the humanities and liberal arts in 2015,¹ that finding tells us very little about the number of students in science or vocational tracks who might also take humanities courses.

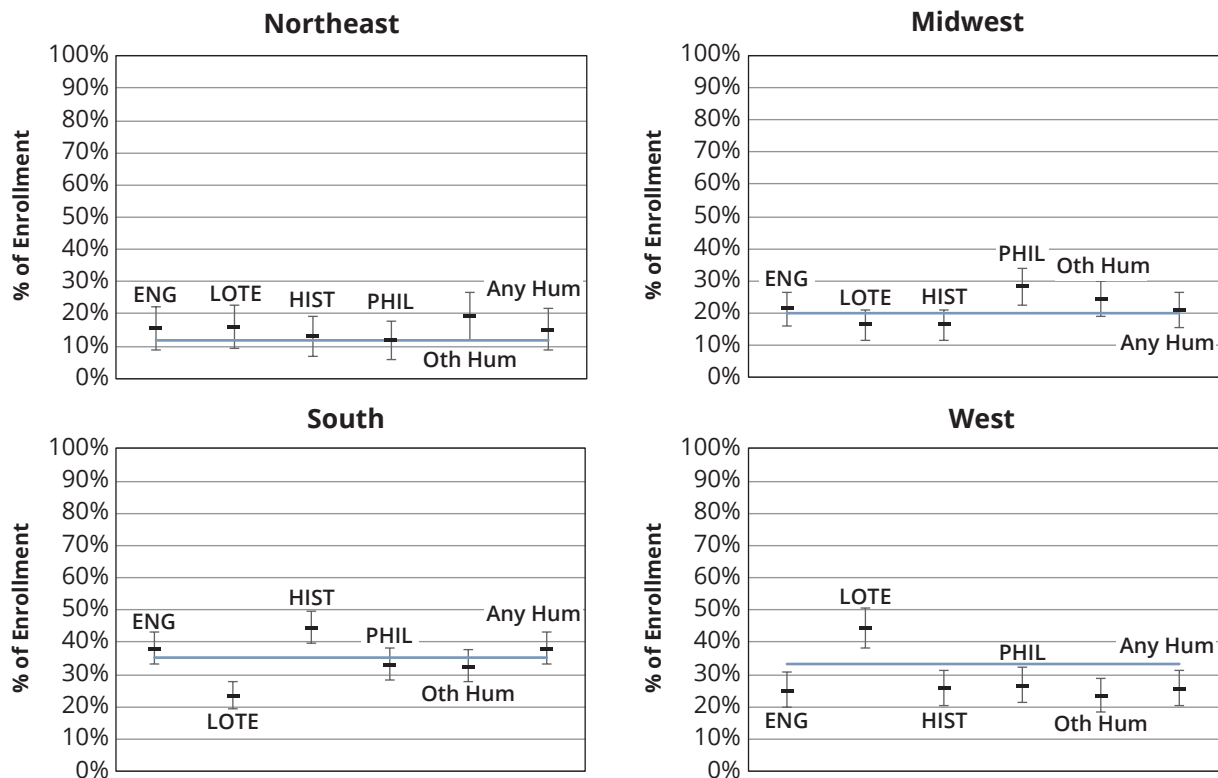
Community College Students Enrolled in Humanities Courses, by Discipline, Fall 2015



Humanities Indicators, 2019 • American Academy of Arts & Sciences

Source: American Academy of Arts and Sciences, Humanities Indicators, "Humanities Education in Community Colleges: A Pilot Study," March 2019, https://humanitiesindicators.org/binaries/pdf/HI_Humanities_Education_in_Community_Colleges.pdf.

Regional Distribution of Humanities Coursetakers at Community Colleges, by Discipline, Fall 2015



Humanities Indicators, 2019 • American Academy of Arts & Sciences

Source: American Academy of Arts and Sciences, Humanities Indicators, “Humanities Education in Community Colleges: A Pilot Study,” March 2019, https://humanitiesindicators.org/binaries/pdf/Hi_Humanities_Education_in_Community_Colleges.pdf.

Note: ENG: English; LOTE: Languages Other than English; HIST: History; PHIL: Philosophy

The middle bar depicts the estimated proportion, and the upper and lower bars depict the range of uncertainty.

Though the survey could not identify the majors of the students taking the courses, it did find a substantial gap between the count of degrees and the number students in the classroom: the survey found approximately 2.8 million students took at least one humanities course at a community college in the fall of 2015.

A majority of those students (over 1.7 million) were taking at least one course in English, indicating a writing requirement at most institutions. The numbers in other humanities disciplines were substantially smaller, with approximately 700,000 students taking a history course; 300,000 students studying a language other than English (LOTE); and about 265,000 students enrolled in a philosophy course. Another 425,000 students took a course in a different humanities discipline or a survey course in the humanities. In all, approximately 40 percent of community college students were

taking a humanities course in the fall of 2015, with one-quarter of the students who were enrolled in for-credit courses taking an English class.

While the topline figures highlight the vast scale of the humanities in community colleges, they mask some notable differences in the distribution of students taking those courses. For instance, some assume that community colleges that focus on preparing students to transfer to four-year institutions have a disproportionate share of students who take humanities courses. To the contrary, the survey found little difference when different types of institutions were compared, except in the shares of students taking language courses – which was higher among students at transfer institutions, and less prevalent at colleges with a career and technical focus. Regionally, students in the South appeared somewhat less

likely to take humanities courses in general (and substantially less likely to take a course in languages other than English), while language courses were popular among students in the West.

High School Students Taking Humanities Courses

The survey also showed that high school students account for approximately 10 percent of students who take courses in the humanities at community colleges, though the share varied widely by discipline. High school students comprised more than 14 percent of the students enrolled in courses in English, history, and languages other than English, but less than 8 percent of the students taking philosophy and other courses in a humanities discipline.

Research indicates that individuals who participate in dual enrollment, which allows students to take courses for college credit while still enrolled in high school, are more likely to attend college, earn a higher grade-point average, and make swifter progress toward a college degree. Yet some humanities faculty at four-year colleges and universities worry that dual enrollment drives down the already dwindling number of students taking humanities courses at their institutions. While the survey cannot directly address the impact of dual enrollment, it does highlight the number and distribution of high school students taking humanities courses at community colleges.

Faculty Teaching Humanities Courses

Another goal of the survey was to determine how many faculty members teach humanities courses for credit at community colleges. The survey does not provide details about the demographics and employment status of the faculty, but it does show that approximately 70,000 faculty taught at least one college-level humanities course for credit at community colleges in the fall of 2015.

Faculty teaching humanities courses represented approximately 20 percent of all community college faculty, with faculty teaching English classes accounting for about 10 percent of the total faculty population (approximately 37,000). Between 14,200 and 14,900 – or approximately 21 percent of faculty teaching humanities courses – taught classes in history; more than 11,000 faculty taught courses in languages other than English; and approximately 5,000 taught courses in philosophy.

One interesting finding from the survey data is that the student-faculty ratio for courses in the humanities was 40:1, as compared to 20:1 for all for-credit courses at a community college (when courses in vocational and nonhumanities subjects are included). Part of the difference may be the smaller classes for labs

and vocational courses, but it might also reflect differences in personnel. Since the survey collected only head counts and not information about the employment status of the faculty, disciplines and fields that use a larger share of adjuncts would have deceptively smaller student-faculty ratios.

Future Research

The survey of humanities education in community colleges was a pilot project for the Humanities Indicators and follows two previous studies of humanities departments in four-year colleges and universities. Though the community college survey provided a unique window into the state of the field in this sector, it also highlighted the challenges involved in collecting data through the college institutional research offices instead of from the humanities departments themselves. Information on key questions – particularly the use of adjunct faculty – remains a lingering area of interest. The Humanities Indicators staff plans to return to the study of community colleges in coming years. As the survey demonstrated, any assessment of the state of the humanities in higher education must include two-year colleges.

For more information about the Humanities Indicators, please visit www.humanitiesindicators.org or contact Robert Townsend, Co-Director of the Humanities Indicators, at rtownsend@amacad.org. ■

ENDNOTE

1. <https://www.humanitiesindicators.org/content/indicatordoc.aspx?i=10807>.

Robert B. Townsend is Co-Director of the Humanities Indicators and Director of the Academy's Washington, D.C., office.

The Privileged Poor

On February 13, 2019, Anthony Abraham Jack (Junior Fellow at the Harvard Society of Fellows, Assistant Professor of Education at the Harvard Graduate School of Education, and the Shutzer Assistant Professor at the Radcliffe Institute for Advanced Study) spoke at a gathering of Academy Members and guests about his new book, *The Privileged Poor: How Elite Colleges are Failing Disadvantaged Students*. The program, which served as the 2078th Stated Meeting of the Academy, included a welcome from David W. Oxtoby (President of the Academy) and an introduction from Bridget Terry Long (Dean of the Faculty of Education and Saris Professor of Education and Economics at the Harvard Graduate School of Education). Danielle Allen (James Bryant Conant University Professor at Harvard University and Director of Harvard's Edmond J. Safra Center for Ethics) participated in a conversation with Anthony Jack following his opening remarks. An edited version of his remarks and of his conversation with Danielle Allen appears below.



Anthony Abraham Jack

Anthony Abraham Jack is Junior Fellow at the Harvard Society of Fellows, Assistant Professor of Education at the Harvard Graduate School of Education, and the Shutzer Assistant Professor at the Radcliffe Institute for Advanced Study.

Thank you for this amazing opportunity. It is truly an honor to be here today. Growing up, I never thought about writing a book and so to celebrate its launch in this space with all of you is beyond words. Thank you to Francesca Purcell and Judith Polgar for all your help in making this event happen. Thank you also to the janitors,

Higher education is highly unequal and depressingly stratified.

cooks, and those who do the unseen work that is no less important.

Let us begin with some humbling and basic facts: Higher education is highly unequal and depressingly stratified.

Although first-generation college students make up roughly 50 percent of the students at four-year schools, they constitute only 14 percent of the undergraduates at the most competitive colleges who come from the bottom half of the income distribution. Most students from lower-income families are disproportionately relegated to community, for-profit, and less selective colleges, where resources are fewer and graduation rates are lower. This contrast is even more striking when you consider that children from families in the top 25 percent of the income distribution take up almost 75 percent of the seats. Economist Raj Chetty and colleagues found that thirty-eight colleges have more students from families in the top 1 percent of the income distribution than students from families in the bottom 60 percent. At Washington University in St. Louis, for example, the ratio is almost four to one. This disparity is especially troubling given that selective colleges like Amherst,

Harvard, Michigan, and Virginia serve as mobility springboards for those from disadvantaged families compared to lower-tier colleges.

Students from poor families were once kept out of these bastions of privilege by a devilish duo. We – and include myself in this group – were excluded by lack of information, on one hand, and tuition costs that rivaled or even eclipsed our family's *annual* incomes, on the other. Some colleges took action. Beginning with Princeton in 1998, several colleges began enacting initiatives like no-loan financial aid policies to combat class inequalities that have a stranglehold on our delicate democracy and even more fragile system of higher education. With an unprecedented gift from Michael Bloomberg this past November, Johns Hopkins University will join the list of no-loan colleges in this country. Through these initiatives, colleges declared that money will no longer be a barrier to entry. It will no longer curtail your success.

But uncritically praising universities as democratic institutions for increasing access reflects a limited civic imagination. An admissions letter and generous financial aid do not a diverse college make. Access ain't inclusion.

I worry that colleges have extended coveted invitations to excited, eager, able youth before adequately preparing for their arrival. We seem to have forgotten an old truth:

Citizenship is so much more than just being in a place. It is accessing all the rights and privileges pertaining thereto.

This is what I study. It is also what I lived and live.

“Where are the other poor, black people?” This is the first question that I can remember asking myself in 2003 after I arrived at Amherst College and took part in what I call “convocation conversations.” You know what I’m talking about – those chats in which people conveniently work in verbal versions of their resumes and narrate their summer schedules for any and all to hear. My new peers swapped stories of multiweek trips abroad and fancy parties hosted at second homes. They regaled us with personal accounts of courtside seats to professional basketball games and invitations to private premiers of movies that had not yet hit theaters. They knew about Canada Goose before it was cool. These were class markers I associated with rich people. My first time on a plane was traveling from Miami to Amherst for my recruiting trip. Back home, summer was just a season. At Amherst, summer was also a verb.

What I thought I found on my first days at Amherst was the legacy of William Bowen and Derek Bok’s groundbreaking study, *The Shape of the River: Long-Term Consequences Considering Race in College and University Admissions*. In this work, they showed that an overwhelming majority of the black students at elite colleges come from privileged backgrounds: the sons of lawyers, or daughters of doctors, or children of commerce. I resigned myself to be, yet again, the only poor black person in a rich, white place.

Imagine my surprise, however, when one of my classmates who studied abroad in Spain during her junior year of high school turned out also to come from a family that struggled to make ends meet. Feeling comfortable with each other, we shared stories of doing homework by candlelight. We did

this not to be romantic but rather because the power was out. We knew a common struggle all too well: that sometimes there was more *month* at the end of the *money*. The vacation homes my new classmates ventured to, it turned out, were not their own, but rather those of their wealthy high school peers. Alas, I was not the only one granted access to privileged experiences and places beyond what my family could afford or even knew about.

Like my freshman imagination, social science research did not make space for these experiences as part of the larger first-gen story. When social scientists wrote about lower-income students, they wrote of a single experience chronicling culture shock and social isolation.

I worry that colleges have extended coveted invitations to excited, eager, able youth before adequately preparing for their arrival. We seem to have forgotten an old truth: Citizenship is so much more than just being in a place. It is accessing all the rights and privileges pertaining thereto.

Yet all the while, as my research uncovered, colleges and universities were hedging their bets: they were getting their *new* diversity from *old* sources: the Andovers and Exeters of the world. So, I set out to trouble the waters.

The Privileged Poor focuses on undergraduate life at pseudonymous Renowned University, an elite, wealthy, white university in the Northeast that adopted no-loan financial aid policies. I sat down with 103 black, white, and Latino undergraduates and conducted ethnographic observations of campus life for two years to investigate what it is like to be a student at Renowned. In this research, I highlight how lower-income

undergraduates at Renowned have shared beginnings but lived evermore divergent lives before coming to college. I explore the experiences of those who live in poor, often segregated communities but enter college from elite boarding, day, and preparatory schools like Exeter, Choate, or Dalton – those whom I call the *Privileged Poor*. I compare their experiences to equally economically distressed peers who enter from local, typically distressed public schools – those whom I call the *Doubly Disadvantaged*.

Admittedly, these terms are loaded. To be honest, this choice is purposeful. In addition to the oxymoronic quality of “Privileged Poor” that sticks with you, like jumbo shrimp, to engage with or even find fault in the terms still forces one to interrogate what

they intend to capture. How can one be privileged and poor? Even using the qualifier “doubly” inspires an intersectional way of thinking when there previously wasn’t one.

Personally, I wanted to move the conversation away from individual differences to focus on how structural inequalities like segregation, joblessness, poverty, disinvestment in public K-12 education, and the hollowing out of both center cities and the nation’s bread basket manifest themselves on our campuses. My investigation into this overlooked diversity among lower-income youth pushes back against the dangerous downplaying of how prolonged exposure to savage inequities in our neighborhoods and

I wanted to move the conversation away from individual differences to focus on how structural inequalities like segregation, joblessness, poverty, disinvestment in public K-12 education, and the hollowing out of both center cities and the nation's bread basket manifest themselves on our campuses.

schools affect how students navigate college, if they make it there at all.

We cannot escape the fact that while some neighborhoods and secondary schools keep us from hurt, harm, and danger, others place us in the thick of it.

Conventional wisdom dictates that you need to know where you've been to know where you're going. When it comes to understanding the undergraduate experience, the same sentiment is true. We must examine where students come from – and what they have been through – to understand why they chart the paths they do once they reach our gates. Doing so forces us to think about how school policies and practices facilitate or hinder that process.

Which students immerse themselves in the college community? Who wants to leave after the first week? Who gets the strongest letters of recommendation and life-changing internships? Who says of their experience, "I couldn't breathe here?" Who calls their college "a toxic environment"? Or what about those who call college "unsurprising," label it "the next step," or liken college to "déjà vu"? To overlook the rich diversity of experiences within first-generation college students is to base policy on only a partial picture. As it stands, our understanding of how poverty and inequality, and class and culture shape college life remains incomplete and the policies we implement to help students miss the mark.

For example, colleges expect students to be comfortable and proactive in forging relationships with faculty. This is the road to extensions, extra help, recommendation letters, internships, and invitations to special dinners. This is the road to emotional support when times get rough. Yet this expectation remains unsaid; there is no manual of dos and don'ts, whens and hows. An unspoken, "If undergraduates want something, they will come," operates as the gold standard, the college corollary to the squeaky wheel gets the grease. Imagine the culture shock, then, that some first-gens experience navigating what sociologist Jean Anyon calls the "hidden curriculum."

Let me offer a few examples. Alice, a quick-witted Latina with a penchant for short answers, attended a segregated, public high school. She revealed to me that her four years before Renowned were filled with classmates fighting, setting trash cans on fire, and skipping school. For her teachers, maintaining order took precedence to teaching. Her transition to college was rough. She doesn't feel at home at Renowned; she says being here contradicts everything about her life back home: the people, the culture, the very buildings she passes on the way to class. Professors informally say, "My door is open." She doesn't believe them. She feels "too intimidated, too afraid to talk to people" and consequently she "rarely [goes] to school-sponsored people for things."

In contrast, Ogun, a reflective and discerning Latina, hails from a troubled neighborhood but attended an affluent boarding school with a multi-million-dollar endowment. Her largest class had twelve students and contact with teachers inside and outside the classroom was an everyday occurrence. Studying abroad was not only an option, but also encouraged. Office hours were built into the culture of the school. She reports feeling "empowered to go talk to a professor and say, 'I want to meet with you.'" She even goes on to say, "My school instilled in me that I'm allowed to do that; it's actually my right." When her instructor was away from campus, Ogun had no qualms calling his cell phone for virtual office hours despite friends' surprised looks and admonitions.

What was new for Alice was old for Ogun. What was a mismatch for Alice was a match for Ogun. These differences result not from individual deficiencies, but rather from societal defects. Colleges mistakenly and erroneously see Ogun as engaged and Alice as disinterested.

Moreover, colleges reward students accordingly. One residential advisor shared that when it comes to nominating students for awards and different honors, "The process is relationship-dependent, unfortunately. . . . Oftentimes the best candidates are not put forward. It's hard to tease out what is meritocracy and what is nepotism, favoritism, cronyism or whatever you want to call it."

Undergraduates from America's forgotten neighborhoods *and* ignored schools are truly at a disadvantage as colleges continue to privilege the privileged.

But I am not so naive.

Knowing how to navigate social relationships with faculty and deans is not the only hurdle that lower-income students face. There are things that no amount of cultural capital can combat. Where

Alice and Ogun's experiences align, their shared economic disadvantage is more salient in shaping their sense of belonging, overall well-being, and ability to perform academically.

Walking around campus in March, I hear stories of trips home to rest, to Europe for backpacking, and to Mexico for partying. I even joked with one student fresh off the plane from the Caribbean, still wearing his straw hat, that he looked more like one of my cousins than his white, New England kin. Six days in the sun had given him a golden glow. Spring Break, however, means something different for lower-income students. As Valeria, a lower-income Latina from California, laments, "There's always famine during Spring Break."

Alice and Ogun know hunger's sting all too well, and not just from when food stamps ran out at home. You see many colleges assume that all students depart campus during Spring Break. At Renowned, which closes all of its dining halls during the break, these closures result in one out of every seven students having to fend for themselves for meals. Let's think about that for a moment. At one of the world's wealthiest universities, one out of every seven students face food insecurity.

Closures, sadly, are a common college practice: Of the nearly eighty colleges that have adopted no-loan financial aid policies – the institutions that are most progressive when it comes to aid – as of 2014 only one in five kept their dining halls open during Spring Break. Johns Hopkins, even with its \$1.8 billion gift, closes its dining halls during the break.

To make matters worse, some colleges charge students upwards of \$35 a day to stay in their own rooms in the residential halls during Spring Break or in someone else's room who has left on vacation. One college goes so far as to change the locks on students' rooms to prevent entry.

When your pocket is as empty as your stomach, you are more worried about your next meal than recounting trips to the West Tisbury Market. Nicole, a lower-income black student who went to a private high school on scholarship, notes, "Spring Break is the most blatant break where privilege and wealth play a part in whether or not you leave." And as Maria, a lower-income Latina, asks, "How can you support yourself when you can't feed yourself?"

Capturing this harsh reality with comedic seriousness, Arianna says that "Spring Break is the real *Hunger Games*" and the odds are never in poor students' favor. Just how close this reality comes to living in the districts is downright depressing.

Our understanding of how poverty and inequality, and class and culture shape college life remains incomplete and the policies we implement to help students miss the mark.

At the most recent IvyG conference, where students from all over the country discussed what it meant to be a first-generation college student, one young white woman, with a pixie haircut and wearing a Columbia University sweatshirt, stood in a room full of people to discuss Spring Break. Looking at me as if for courage, she revealed how she spent her last Spring Break at one of the most elite, wealthiest universities in the country: she increased her online dating activity in the lead up to Spring Break to secure dates for the following week. You see, banking on gender norms of older men paying for the first date, she felt that her only option was to use *OKCupid* as if it were *DoorDash*. She treated *Tinder* as if it were *GrubHub*. In order to eat, she offered her time. In order to eat, she offered herself.

This makes no sense. Yet this is life for far too many undergraduates. Furthermore, this reality goes beyond just what poor students face. What about the students who do not have a home to go back to? The disowned. Those who defied both the odds and their parents by choosing a college away from home instead of working or going to school nearby. The unwanted. Those students who know that harm and home are sometimes synonymous.

New students require taking on new responsibilities. We must move from access to inclusion. We must ensure that social class – symbolically and materially – does not keep lower-income students in secondary positions.

To embark upon the crucial task of making colleges look more like the world, we must question what we take for granted. We must examine how *both* the symbolic and material dimensions of class affect campus life. We must work to ensure that students do not just graduate, but that they do so whole and healthy.

As each class becomes ever more diverse, so do colleges' connections to once overlooked communities, for these new ties bring various inequalities into sharper and sharper relief. I hope that *The Privileged Poor* not only sheds light on the problems at hand, but also provides a framework for addressing them.



Danielle Allen

Danielle Allen is the James Bryant Conant University Professor at Harvard University and the Director of Harvard's Edmond J. Safra Center for Ethics. She was elected a Fellow of the American Academy of Arts and Sciences in 2009 and serves as a Cochair of the Academy's Commission on the Practice of Democratic Citizenship.

Before we begin our conversation, I would like to name a few of the ways in which *The Privileged Poor: How Elite Colleges are Failing Disadvantaged Students* is really an important book. First, it has made something visible that went unseen for too long. At the most basic human level of sharing stories that needed to be heard and that were not being heard, the book is profoundly important. But that work of sharing stories also changes the research agenda. It makes the point that though we had studies of higher education that touched on inclusion and access, an important piece of the necessary research agenda was missing. And why was it missing? Because people with the relevant experience were not at the table of research and able to put the relevant questions on that table. This book

brings a new voice to the table and broadens the research agenda. There is also the conceptual work that the book does: the careful distinction between what social capital and what material capital provide for people and the fact that one can't think of disadvantaged or low-income students in broad strokes. To understand their experience, you need to parse the different effects that access to cultural, social, and material capital have. Now the human point and the conceptual point come together. Tony Jack has combined a fundamentally humane instinct for seeing the fine-grained nature of individual students' experiences with a wonderful conceptual lucidity that gives people tools for scaling his human insights in support of broader social analyses. That is an incredible achievement. The list of important things that this book does is long, and I won't go through all of its virtues, but I do want to say one last thing about the book. It is beautiful and moving as just a piece of writing. The book recounts unforgettable stories. Tony tells the story of students at Renowned who serve on the custodial service team, an activity that is presented as a pre-orientation program on par with camping trips and arts and service programs. How can cleaning up after one's fellow students who are on a proper pre-orientation program be a preparation for anything other than on-campus hierarchy? Students' experiences of this pre-orientation program are stories that need to be told out loud, and Tony does this. He tells these stories in the most generous and humane way, but without sparing any of the kind of steely evaluation that is necessary for stories of that kind.

It is such a pleasure to be able to sit and talk with you, Tony, about this work. I would like to start by asking a little bit more about you and your own journey because an important part of this story is the fact that you decided to turn your experience into scholarship. How did you make that decision?

Anthony Jack

I studied religion and women's and gender studies at Amherst; I was also premed. Being at a liberal arts college, with someone else paying the bill, inspired me to take advantage of as much as I could. At graduate school, I started reading cultural sociology with Michèle Lamont. We were focused on the sociology of education, but the story always felt half-right to me. I didn't see myself and my classmates at Amherst in the narrative. And that made me want to try to figure out how I fit in. I reflected on when I was a diversity intern in the admissions office and worked to recruit students—very similar to the Oliver Scholars and the Wight Foundation programs that place students in private schools and then those private schools funnel the students into elite schools. I am reading this literature on the sociology of education, on cultural sociology, and no one is talking about the group of students that I identified with and that I literally helped to recruit. I decided to do my qualifying paper—QPs can change your life, for those graduate students in the room—on the experiences of lower-income students. And that is when I started looking at the differences between those who went to prep schools and those who went to public schools. I didn't go in looking for that. I let it emerge organically because I asked students about their families, their neighborhoods, and their high schools before moving on to their college experiences. They described similar families and very similar neighborhoods, but as soon as they got to high school, their paths diverged tremendously.

Danielle Allen

But you have escaped my question. What I really want to know is why did you go to graduate school? Why did you make that choice?

Anthony Jack

I am a first-generation college student. When I went to my commencement at Amherst and I saw the robes, I absolutely fell in love with the robes.

Danielle Allen

You know what? That is my answer too.

Anthony Jack

Are you serious? Then I'm in good company. The pomp and circumstance and the pageantry are beautiful. "The privileges pertaining thereto" is what Amherst says when they give someone a degree. I fell in love with that. I wanted to be a scholar and I never thought it would be my life, but then I looked at the life of a professor: setting your own research agenda, asking questions that are important to you, and pursuing this work with as much energy and passion as you want. So in thinking about graduate school, I made the decision that I wanted to continue to learn, I wanted to continue to explore.

Danielle Allen

In your opening remarks you referred to belonging as consisting of full membership on campus and "the rights and privileges pertaining thereto." In fact, when we were talking before the program, I had asked you about the concept of belonging. I remarked that after reading your book, I wasn't sure you were using "belonging" in the conventional way that it has come to be used, as a reference to a psychological state. You concurred and said that you think a sense of belonging matters, a psychological feeling of ownership matters, but actually that isn't enough. You put the emphasis on the concept of inclusion. And the way you defined it when we were talking was that inclusion is about having access to the "rights and privileges pertaining thereto": that is, pertaining to being a member of an academic

Undergraduates from America's forgotten neighborhoods *and* ignored schools are truly at a disadvantage as colleges continue to privilege the privileged.

community. That's a powerful definition. As you worked with these students you saw all kinds of ways they were blocked from having the rights and privileges pertaining to the community of educated people, of scholars, and so forth. Let's talk a little bit more about that conception of academic citizenship and your picture of access in its full description.

Anthony Jack

You have put your finger on it. To me, belonging is a first step toward inclusion because belonging, feeling like you are in a place, is where it starts. I wanted to explore feeling included as an equal member of that community: that you can go to the career service office, you feel perfectly fine going to mental health services, you feel okay going to office hours – making those connections and building that developmental network. I wanted to push the conversation beyond simply feeling like you wanted to belong in a community. Are you making that community work for you? College is about exploration and learning, but it's also about getting what you need. I always tell my students who are first-gen, "Get what you need out of this place." But some people really don't feel comfortable doing that. Office hours and open-door policies scare them as much as sitting in the front row of a class. They feel it should be about the work, not how you network. They feel that their A or B in class should be enough. But how do you make them feel included in the life of the school that goes beyond statements such as "Yes, I live in this dorm" or "Yes, I belong to this club." How do you make yourself feel

fully included? How do you promote that? And that is something that I really wanted to include. It is about citizenship but I chose inclusion to speak more to the data as well. At the Ed School we have this phrase "usable knowledge." How can our research lead to direct policy changes that promote positive outcomes for children and youth?

Danielle Allen

Your book contains policy suggestions. Some are about things that colleges and universities can do, and we'll talk more about that in a moment, but you said earlier this evening that the experience of inclusion was partly about information and partly about tuition. What if there were a students' bill of rights as a starting point? Would something as basic as that make any difference or is that a wrongheaded way of thinking about how people come to claim these rights and privileges?

Anthony Jack

I think we need to question what we take for granted on a college campus. We need to make some things very explicit. For example, we reach out to families when we want money or when we want them to send care packages, but what happens if we reach out to them and say, "This is what it means to be a student here." Office hours are important because they are how we get to know your student, to learn their interests and likes. This is what the career service office is for. We need to define what fellowships and internships and winternships are and the plethora of new terms that they will encounter. How do we lower the barrier to

We must move from access to inclusion. We must ensure that social class – symbolically and materially – does not keep lower-income students in secondary positions.

entry? Information is important, but we need to be intentional in the way in which we engage students – meeting them and understanding that there’s a true diversity of experiences in our classrooms and in our dorms. This isn’t a one-size-fits-all model.

Danielle Allen

Let’s talk about your experience as a researcher because another thing that was very moving in the book was that as you were conducting these iterated interviews with students over time, it was hard for me as a reader not to get the impression that you were simultaneously doing incredible work as a mentor in helping these students. At a very basic level, in some way that I have trouble articulating, you as a researcher were part of the solution to their experience. You were researcher and mentor simultaneously.

Anthony Jack

To be honest with you, that line was blurred from day one. Not in the analysis but in the carrying out of data, both micro and macro, in the sense that I was part of the solution. Let me explain how. I invited any student who was on campus during Spring Break to a meal and a movie. I used those moments to reconnect with students outside of an interview and we broadened the conversation to bigger things. I also opened myself up to help the university become better. I took a gamble as a graduate student to share findings and give presentations to senior leadership, which is risky. Somebody might say, “Well, now you can’t do the rest of your research” or they can put up road blocks or

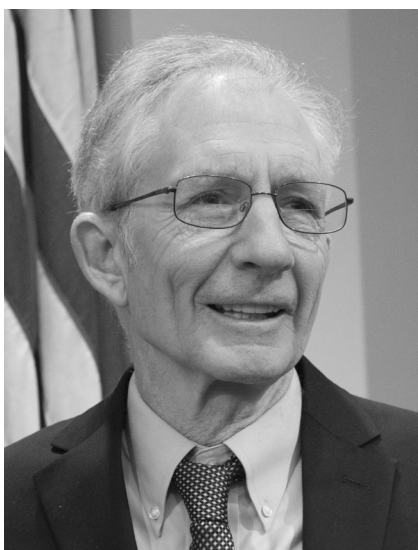
scoop your research. So I took a gamble because I had the data and wanted to deepen my own understanding of what universities can do in response to this information. But I also wanted to know what I was up against to try to get universities to change. I was fortunate enough to open the dining halls during Spring Break. That is how we were able to confirm that one out of seven students stayed on campus. There is also a program called Scholarship Plus in which students get free tickets to events. Those tickets used to be given out at a separate table at the back entrance of buildings. You can imagine the lower-income students, predominantly black and Latino with a few white and Asian students sprinkled in, entering through the back door and the students who can afford to pay entering through the main entrance. We changed that process. There were moments of back and forth between myself and the university as I was constructing my dissertation, which is now this book. I took a gamble, but I was a support network for students to the point that they saw me more as a therapist than peer researcher. But they touched me too. I FaceTime with parents and sometimes get birthday gifts. I became very close with the students I met. ■

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To view or listen to the presentation, visit www.amacad.org/events/book-launch-privileged-poor.

Building, Exploring, and Using the Tree of Life

On March 6, 2019, Douglas E. Soltis (Distinguished Professor in the Laboratory of Molecular Systematics & Evolutionary Genetics at the Florida Museum of Natural History and the Department of Biology at the University of Florida) and Pamela S. Soltis (Distinguished Professor and Curator in the Florida Museum of Natural History at the University of Florida and Director of the University of Florida Biodiversity Institute) spoke at the Academy about a project that harnesses algorithm development, computer power, and DNA sequencing to create a comprehensive visual Tree of Life. The program, which served as the 2079th Stated Meeting of the Academy, included a welcome from David W. Oxtoby (President of the Academy) and an introduction from Scott Vernon Edwards (Alexander Agassiz Professor of Zoology at Harvard University and Curator of Ornithology at the Museum of Comparative Zoology). An abridged version of Douglas Soltis's and Pamela Soltis's presentations appears below.



Douglas E. Soltis

Douglas E. Soltis is Distinguished Professor in the Laboratory of Molecular Systematics & Evolutionary Genetics at the Florida Museum of Natural History and the Department of Biology at the University of Florida. He was elected a Fellow of the American Academy in 2017.

What we would like to do this evening is to take you on a journey with the Tree of Life. To start, what do we mean when we say the Tree of Life? Well, really, we are talking about biodiversity: the totality of life on Earth – all 2.3 million described species and perhaps one hundred

Throughout human history, cultures have used the image of a tree to represent their connectivity to all living things.

million species that have yet to be discovered, described, and named. A. E. Waite really sums up the importance of the metaphor of the Tree of Life throughout human history: “Behind the Man is the Tree of Life.” Throughout human history, cultures have used the image of a tree to represent their connectivity to all living things. If you imagine a giant tree with leaves: we are but one leaf with all the other species on our planet that are connected to that tree.

The Tree of Life imagery has had spiritual, religious, magical, and mystical connotations to people throughout human history. One might say that the Tree of Life is really a concept that is as old as our own species. There are examples of Tree of Life artifacts from around the world that date back as far as 4000 B.C. The Tree of Life is mentioned over ten times in the Bible, but it is usually the Tree of Knowledge of Good and Evil that gets all the attention.

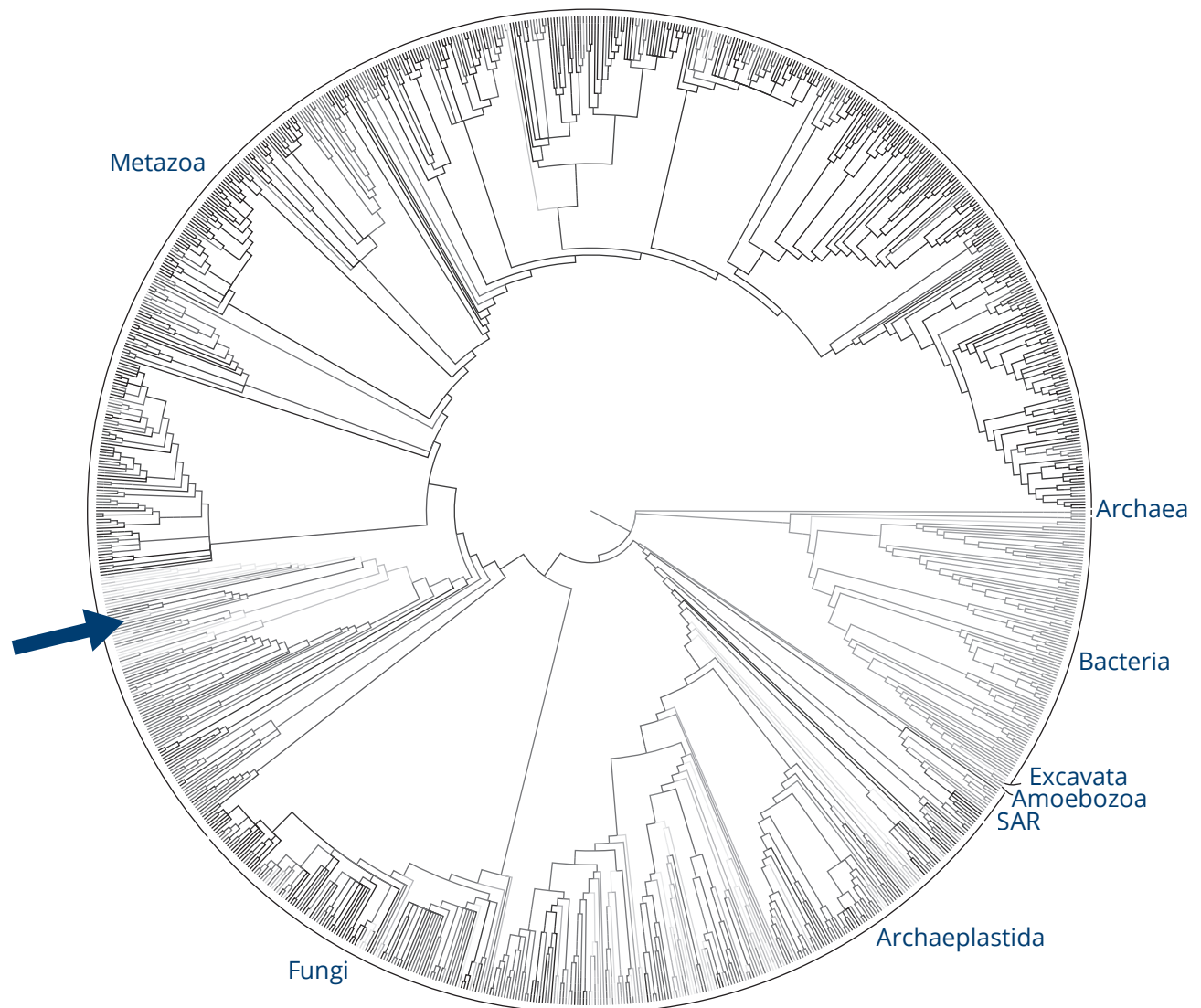
The Mayan Tree of Life is similar to many other trees of life, connecting species as well as gods. Connections to the underworld run through the roots of the tree. Furthermore, in many of these Tree of Life stories,

damage to the tree was taboo. The Hopi Indians in the Southwest of the United States, as part of their Tree of Life legend, refer to an earlier civilization that abused and over-exploited the Tree of Life, which ultimately led to their demise. Words to live by today!

The modern concept of the Tree of Life traces to the time of Darwin. As he said in *On the Origin of Species*: “and so by generation I believe it has been with the great Tree of Life, which fills with its dead and broken branches the crust of the earth, and covers the surface with its ever-branching and beautiful ramifications.”

The Tree of Life idea was so important to Darwin that the only diagram that he included in *On the Origin of Species* is his sketch of the Tree of Life. It is a diagram that shows a tree of relationships. This concept inspired other biologists of the time, including the famous German biologist, Ernst Haeckel, to begin to draw and depict what the Tree of Life might look like. And scientists did this for the next 150 years. They drew trees by hand to depict evolutionary relationships, of how they thought organisms were related. It really wasn't until

Figure 1: Tree of Life



Source: Cody E. Hinchliff, Stephen A. Smith, James F. Allman, et al., "Synthesis of Phylogeny and Taxonomy into a Comprehensive Tree of Life," *Proceedings of the National Academy of Sciences* 112 (41) (October 13, 2015): 12764–12769. Image courtesy of Stephen A. Smith.

quite recently, until 2015, that the first comprehensive Tree of Life for all 2.3 million species that have been named so far finally appeared (see Figure 1).

The major groups are labeled around the tree. All 2.3 million species are represented at the tips. The nodes that run throughout the tree are the inferred ancestors. The arrow in the image indicates you; it is the position of *Homo sapiens* on the Tree of Life. I like these big trees because they are humbling. They show that we are just one small branch on this giant Tree of Life. We

don't get a gold star; we don't have a larger or thicker branch; we are just one small branch. This is a hypothesis of relationships, a rough draft of what we think the Tree of Life might look like.

Now, if Darwin were here today, he might ask what took so long. There are several reasons why it took so long to build the Tree of Life. The first is that unlike other fields, such as chemistry, physics, and astronomy, tree-building is a very young field. It was only in the 1960s that people started building trees in a somewhat rigorous manner

that used data and repeatable methods. And just to make things more confusing, scientists depict trees in various ways. Tree thinking is a recent development when you consider the history of science.

The second reason it took so long is that building trees, especially really big trees, is hard. It rivals some of the most complex problems in mathematics, astronomy, and physics. Let me explain why.

If we start with three species and we try to build a tree of how they are related, there is only one way the species can be connected:

three species give us one possible (unrooted) tree. If we have five species, we have fifteen possible trees. With ten species, we have over two million possible trees. As we see, these numbers are increasing logarithmically. By the time you get to twenty species, you are now approaching 1 mole of trees: in other words, 6.02×10^{23} trees. And by the time you get to about two hundred species, the number of possible trees exceeds the number of atoms that we think are in the universe. So, these are big, complex problems. It is no wonder then that building the Tree of Life was long considered a grand challenge in biology, a moonshot for biodiversity science. In fact, there are published papers in esteemed journals including *Science* that stated it was basically impossible to build a comprehensive Tree of Life.

But we ultimately did it and by we, I mean a large community of scientists. This was a team effort that really reflects how modern scientists operate and how science works. It was a perfect storm of algorithm development, computational power, and DNA sequence data.

Now, just how big is the Tree of Life? How big is a tree that has 2.3 million species? If you printed the Tree of Life as we now know it in a linear format, using standard sheets of paper that measure 8.5 x 11 inches, with species in twelve point font, it would take four sides of fourteen Empire State Buildings just to display the Tree of Life for 2.3 million species.

But we have a long way still to go. We are just at the starting point. As the famous biodiversity scientist E. O. Wilson has said, "It is entirely possible that specialists have discovered only 20 percent, or fewer, of Earth's biodiversity at the species level. . . . Scientists . . . are in a race to find as many of the surviving species as possible . . . before they vanish and thus are not only overlooked but never to be known."

Let's consider our tree again. We have DNA data for only 17 percent of the species

on the tree. That is abysmal. We estimate that there are at least ten million more species on our planet that have never been named and have never been included in any tree of relationships. For anybody who is interested in the Tree of Life, there is plenty of work still to do. Now what this doesn't reflect adequately is the bacterial world. When we consider bacteria, there may be one hundred million species or more that remain unnamed and not placed in any tree. Madonna's well-known song lyrics, "we are living in a material world," are off by one word. We are living in a bacterial world!

Even in areas of the world that are well-studied, for example, much of North America, there remain cryptic species that have never been noted, never been identified, because they are difficult to distinguish. Species that look similar to us may be very distinct genetically. And this is very common in the plant, animal, and fungal worlds. What is the value of knowing more about the Tree of Life? Why is it so important? As the prominent geneticist and evolutionary biologist Theodosius Dobzhansky said, "Nothing in biology makes sense except in light of evolution." The modern corollary to that statement is, "Everything in biology makes more sense in light of a tree of relationships." We all understand that because of the importance of our own family trees. If you have an ancestor who has a disease that is genetically controlled, you know there is a strong probability that you inherited that trait. Trees of relationships are predictive, whether they are your own family tree or the Tree of Life.

Let's consider some examples of why it is so important to our well-being to know more about the Tree of Life. First is drug discovery. Most of our medicines come from plants. So how do we find the next generation of medicines? There are about half a million green plant species, so it would take a long time to survey each one individually.

That had been the traditional approach. A better approach is to use the tree of relationships, the Tree of Life, and take advantage of what we already know. So, for example, if you are going to look for the next generation of heart medicines, or medicines for nervous disorders, there are only a couple of places in the Tree of Life where you would probably want to look because that is where the plants that yield these compounds have all been found so far. And in those parts of the tree, there are thousands of species that have never been tested for their chemistry. But we know they have those compounds (see Figure 2).

A second example is crop improvement. Where do we obtain genes for disease resistance, water use efficiency, and increased yield? You look for the closest relatives of crops by using the Tree of Life. The following quote from J. D. Miller at the U.S. Department of Agriculture sums up the whole story: "If no germplasm from wild relatives had been used, there would probably not be a viable sugarcane industry in any place in the world." This is true for many of our crops. Let me share an example from our own lab. We had a student who studied domesticated squashes, things like pumpkin, acorn squash, butternut squash, and the like. If you have ever grown squash, you know that they require a lot of water. So how do we build a better squash? Our student, Heather Rose Kates, built a tree of relationships for squash and their relatives, and she found that the closest relatives of these plants, the ones that we domesticated, are dry-adapted species that are found in the arid Southwest. The collected germplasm can be used in breeding programs to help build a squash that is less water-loving and more dry-adapted.

My third example relates to disease. One of the first lines of defense in studying disease is to build a phylogeny, a tree of relationships. Many of you may remember the

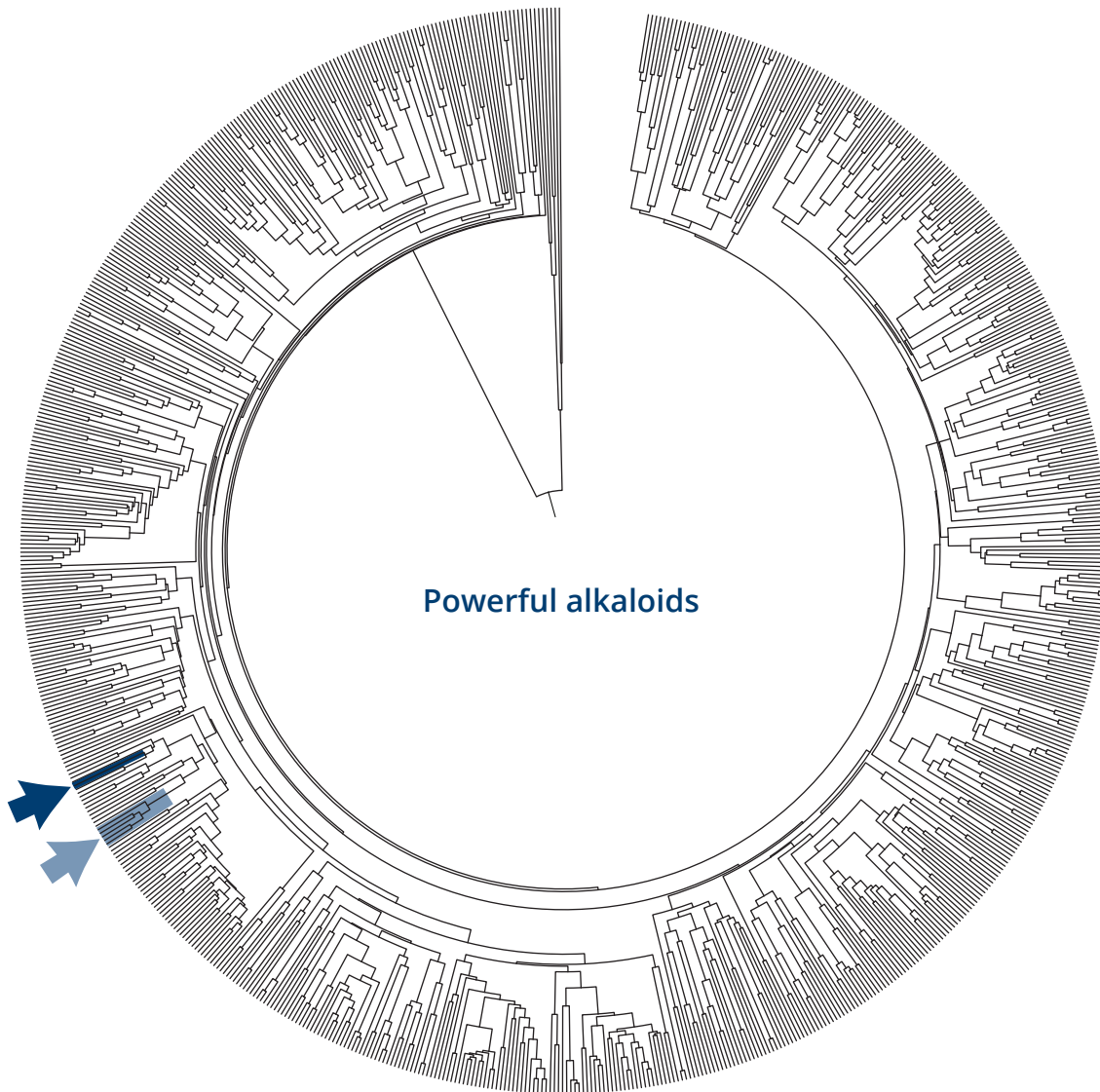
Figure 2: Medicinal Hot Spots

Image courtesy of Ryan Folk.

SARS epidemic from 2002–2003. It started in China; there were more than 750 deaths in thirty-seven countries. It was considered a possible pandemic. But what was the source of SARS? By building a tree of relationships, it became clear that the jump to humans occurred either from civets, a small mammal, or from a species of bat. Trees of relationships are critical in studying disease.

Trees of relationships are also important in the study of conservation, which is my fourth example. There is a little bird called

the white-winged warbler. When you do a phylogenetic study and build a tree, you find that this bird is not a true warbler. Furthermore, this bird is found on only one island, the island of Hispaniola. So, by using the Tree of Life, the white-winged warbler became a species of conservation concern. And there are other examples of how using the Tree of Life is important for conservation.

A fifth example is the response of organisms to climate change. Because trees of

relationships are predictive, we can use the Tree of Life to help inform which species may be most susceptible to a changing climate. In other words, we can use a big data approach across large parts of the Tree of Life to better inform people as to which organisms, which parts of the Tree of Life, might be most susceptible to a rapidly changing climate, either increasing temperature or a decrease in moisture and other factors.



Pamela S. Soltis

Pamela S. Soltis is a Distinguished Professor and Curator in the Florida Museum of Natural History at the University of Florida and Director of the University of Florida Biodiversity Institute. She was elected a Fellow of the American Academy in 2017.

I would like to continue with this theme of conservation and response to climate change by considering how the Tree of Life can aid conservation efforts. I will be using examples of plants found in Florida. Now, Florida is home to more than four thousand species of plants, many of which occur in very specialized habitats that are already being affected by climate change. When we examine biodiversity hotspots, such as those in California, the Appalachians, and Florida, how do we determine which species or areas to protect? Often decisions are based on the total number of species that are present, or on a so-called indicator species. But what if we used the power of the Tree of Life to help prioritize these efforts and aid conservation decisions? We can do this by using something called phylogenetic diversity, which takes into account the

We are now in the age referred to by many as the Anthropocene, with extinction rates one thousand times higher than typical and between one hundred and two hundred species being lost per day.

relationships that we see in the Tree of Life. Instead of counting the number of species in an area, we can use their relationships to prioritize conservation decisions.

So how does this work? Well, phylogenetic diversity measures how much of the Tree of Life is present in a given area. Let me use a simple example to explain how it works.

Say we have two areas. The first area has eight species, and they are all oaks. Now to an oak specialist this might seem like great diversity because these oak species may seem different. But to most of us and in relation to the rest of the Tree of Life, these eight species of oaks are all very similar and represent just a very small part of the tree. The second area also has eight species, but they are much more diverse and represent a larger portion of the Tree of Life. This second area would have higher phylogenetic diversity and might be a better target area for conservation because more of the Tree of Life is represented. So, for any area, such as a small region of the Florida Panhandle, we can examine the numbers of species and the types of species that are in that area. We can plot them on a phylogeny and count the amount of branch length, the amount of the tree that is present in the area. To do this, we need a phylogeny or a tree of relationships, which we have built for the flora of Florida. We can get locality information from herbarium specimens, such as the pressed plants that are housed in a museum's herbarium. We have about a half-million or so of these specimens at the University of Florida in the Florida Museum's herbarium. Harvard has several million specimens in its herbarium. Or we can go to

online repositories such as iDigBio, which is the national center for digitized biodiversity collections, housed at the University of Florida. With a tree of relationships and locality information, we can estimate phylogenetic diversity for a range of locations and plot them on a map, which can then be used to target how we want to set up conservation areas.

We can also compare these patterns of phylogenetic diversity with other aspects of the environment or with information on human populations. This can help inform areas that are of high phylogenetic diversity and of greatest concern in terms of human impact.

How well do our current conservation areas capture phylogenetic diversity? We do not always have the best match. Regions that are preserved may have low phylogenetic diversity, but there are other important reasons for conserving an area. Conversely, areas of high phylogenetic diversity may have only limited conserved space. Future decisions about conservation might be better if they take these phylogenetic diversity measures into account.

Despite our efforts at conservation, species are disappearing rapidly. As Daniel Kozlovsky said, "What your parents can hardly remember, you will not miss. What you now take for granted, or what is slowly disappearing, your children, not having known, cannot lament." This is a moving statement. Think about it now in relation to the organisms and plants that our parents were familiar with, such as the chestnut tree, that we barely have any association with, or the things that we recognize as

being important in our lives that our children or our grandchildren may never have the opportunity to encounter.

So, this brings us to the topic of extinction. We are now in the age referred to by many as the Anthropocene, with extinction rates one thousand times higher than typical and between one hundred and two hundred species being lost per day. These levels of extinction are equivalent to the great mass extinctions, such as the one that included the loss of non-avian dinosaurs. What can we do? Species are being extirpated at alarming rates, and we are continually trying to save those that are endangered. E. O. Wilson has suggested that we set aside half of our planet with sites selected from around the globe in order to preserve at least key regions. This argument certainly has some merit. As it turns out, only about 17 percent of the Earth's area is set aside in preserves. But any sort of large-

the report, although most Americans have a positive view of science and scientists, there are some lessons to be learned. For example, most Americans think that scientists should engage with policy-makers but they are also concerned about the use of science in public policy. The report found that confidence in scientific leaders varies based on demographics and on other factors. There are differences by race, gender, age, region of the country, educational background, and political party affiliation. And this means that as scientists, we need to find multiple ways to convey our message to a diverse public. Too often we engage with facts, and we fail to connect. More effective communication may be obtained through art. Science influences our minds, but art touches our hearts.

Our first foray into this art-science relationship was a collaboration with the University of Florida's Harn Museum of Art. Selected works featuring biodiversity from

further connections among people around the globe.

As the show progresses, these fifteen vignettes come and go randomly and they are associated with a member of the audience, who serves as the guinea pig for and the representative of the human species. We have seen members of the audience taking photographs of the projections and engaging with each other. This led us to decide that we needed a smartphone app to increase and enhance the participatory elements. The launch of the app was on April 8, 2019. Then the show will travel to the Atlanta Botanical Garden. We hope to have showings in New York and St. Louis around Earth Day 2020.

Our second major project is a fifteen-minute animated movie about the Tree of Life, developed in collaboration with the Digital Worlds Institute at the University of Florida. This movie, called *TreeTender*, has been translated and is available with Korean, Chinese, Spanish, and Portuguese subtitles, as well as closed captioning in English. We held the premiere at the Florida Museum in 2017. The audience exceeded our expectations. Many hundreds of people crowded into the room to see the movie.

[Editor's note: the audience that gathered at the Academy watched the movie trailer.]

We think that this combination of science and art may be the way forward, or one way forward at least, in helping us to convey some of the magnitude, beauty, and majesty of the Tree of Life with the public. Certainly, the information on the numbers of possible ways that we can put species together into a tree and various other sorts of big data questions are really exciting to scientists. But they may not be the most important and effective ways to communicate with the general public. And so we are delighted about the possibility of working with other scientists and artists to continue to develop these new methods for sharing

As scientists, we need to find multiple ways to convey our message to a diverse public. Too often we engage with facts, and we fail to connect.

scale action requires education. H. G. Wells wrote, "Civilization is a race between education and catastrophe." Or, if you are from our era, you might remember this chorus from a song by Crosby, Stills, Nash & Young, "Teach your children well . . . and feed them on your dreams."

We decided to explore some collaborations that involve not only scientists but artists to try to convey our messages about the importance and peril of the Tree of Life. We see that there is support for this approach in the recent American Academy report, *Perceptions of Science in America*. This report gives us some insight into how we might want to move forward. According to

the Harn's collection were connected spatially and thematically by the Tree of Life throughout the museum. More recently, we developed the "One Tree, One Planet" project, which is still ongoing. "One Tree, One Planet" is an artistic project developed by Parisian artist, architect, and environmentalist Naziha Mestaoui. The work is a series of fifteen vignettes about biodiversity, each on a different species and set to music based on DNA sequences that are shared among all life but with a twist for particular species. The goal of "One Tree, One Planet" is to illustrate the connections among all species in the Tree of Life, including our connections with the tree, and to develop

More effective communication may be obtained through art. Science influences our minds, but art touches our hearts.

our excitement about the Tree of Life and the role the tree has in helping us to understand both our place in the world and how best to continue to promote conservation efforts.

I would like to conclude with a quotation from that great biodiversity scientist, Albert Einstein: “Look deep into nature and then you will understand everything better.” The work that we have described this evening is the product of many collaborations. Our science work on the Tree of Life has been sponsored certainly by our university, the University of Florida, but also by the National Science Foundation. Our science and art work has been supported by the Florida Museum, the University of Florida, and the Digital Worlds Institute. We thank everyone who has contributed to this effort.

Questions & Answers

Question

I was wondering where viruses fit into the Tree of Life and what you view as their importance?

Douglas Soltis

Viruses are not incorporated into the Tree of Life that we shared with you this evening. As you may know, there is some controversy as to whether viruses are considered living. But nonetheless, there are many studies using tree-building methods to study viruses, and I mentioned one example, the SARS epidemic. Tree studies are critical to investigating those epidemics. How do they build the flu vaccine that you get yearly that predicts what will happen in that given year? They build a tree of relationships. They take

viral strains that go back for over a hundred years and they build a tree of relationships. They then try to predict what the likely evolution of the virus will be into the next year.

Question

About twenty years ago, some scientists developed three criteria for assigning conservation priorities: representativeness, uniqueness, and irreplaceability. How would you apply those three criteria to phylogenetic diversity?

Pamela Soltis

Let me say that we certainly would not argue that phylogenetic diversity alone can be used as a criterion for selecting regions for conservation. Phylogenetic diversity measures are often highly correlated with species-richness measures and in many cases, those two approaches might give you very similar ideas. On the other hand, it is clear that in some cases phylogenetic diversity might actually capture a different element. It might serve to bring in that uniqueness component a little bit better than just a species number. In addition, as we see when we look at the Florida map, there are areas like the Everglades, which have a unique ecosystem, and we wouldn't want not to conserve those areas because of low phylogenetic diversity. So that argues for not using phylogenetic diversity alone. In addition, there is a region in Florida that has very low phylogenetic diversity overall, but a very high number of locally endemic species, and that is in the Apalachicola River area. Basically, we think that phylogenetic diversity should be just one tool among many that are used. None of this should be done on the basis of

a single criterion. The more tools we have at our disposal, the better we are able to make good decisions.

Question

There has been a considerable amount of evidence of horizontal gene transfer in early organisms and also in the retroviral fragments that make up a good portion of our genome. How does that affect the structure of the Tree of Life as you have depicted it?

Douglas Soltis

I think it is important to realize that the history of life is much more complicated than what is depicted on a tree with simple branching patterns, with descendant species that diverge from an ancestor. Branches of the tree can come back together through hybridization or horizontal gene transfer. The bacterial part of the Tree of Life is often represented as a net of life because there is so much gene exchange and horizontal gene transfer. To be honest, we have not done a very good job of using technology to depict these complex branching patterns. But I think that is the next step.

Pamela Soltis

Let me add that we also know that a lot of species do not originate through bifurcation. They originate through hybridization, coupled with genome duplication. And this is something that we see throughout the history of the plant branch of the Tree of Life. It also traces back in our own ancestry to rounds of whole-genome duplication in the common ancestry of all vertebrates. And so the Tree of Life is really one of branching, returning, branching, and so on. This is why it is so difficult to visualize. It is certainly one of those big challenges for the computer science people who might be interested in this sort of issue.

To quote from that great biodiversity scientist, Albert Einstein: “Look deep into nature and then you will understand everything better.”

Question

I wonder whether there is an effort to have a record both of progressive development and of extinction in the Tree of Life?

Douglas Soltis

We like to talk in terms of a tree of life *and* death because we want to incorporate fossils into our giant trees. There are some versions of the tree that have fossils in them, dinosaurs placed in the tree, for example. There are attempts to do that on a broad scale. But as the trees get larger and larger, it becomes more and more difficult to do that on a comprehensive basis. That is why these projects are team science. You need computer scientists working with paleobiologists and others to put these kinds of comprehensive trees together.

Question

I am curious if you have done any audience analysis so far to see if the kinds of activities that you are giving people to improve their understanding of biodiversity concepts, such as trees, is working?

Pamela Soltis

We have a bit of data so far, which are still being analyzed, so I can't give you a comprehensive answer yet. We distributed some audience questionnaires and conducted surveys and interviews following the premiere of the “One Tree, One Planet” and the *TreeTender* events. Some of the questioning had to do with whether the public understands what we mean by the Tree of Life. The questions were targeted at very general concepts. Once the data are fully analyzed, we hope to see how well the

public understands the whole concept of things being connected. I think tree thinking is a fundamental part of biology that ought to be taught alongside the periodic table. That means, of course, that our teachers need to learn it in order to be able to teach it well.

Douglas Soltis

Let me add an interesting observation. We live in Florida and see people who do not necessarily believe in evolution. They watch *TreeTender*, which is basically teaching evolution without mentioning the word. And it seems they have no trouble with that. Why can we use the Tree of Life as a metaphor and it doesn't bother them? They understand that we are all connected. Yet at the same time they have trouble with evolution. ■

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Select Prizes and Awards to Members

Boris Altshuler (Columbia University) was named a 2019 Simons Fellow in Theoretical Physics.

R. Scott Appleby (University of Notre Dame) is the recipient of the 2019 Religion and International Studies Distinguished Scholar Award, given by the International Studies Association.

David Autor (Massachusetts Institute of Technology) was named a 2019 Andrew Carnegie Fellow.

Lisa Feldman Barrett (North-eastern University) was awarded a 2019 Guggenheim Fellowship.

Donna G. Blackmond (The Scripps Research Institute) was selected as a 2019 Distinguished Woman in Chemistry or Chemical Engineering by the International Union of Pure and Applied Chemistry.

David W. Blight (Yale University) was awarded a 2019 Bancroft Prize in American History and Diplomacy and a 2019 Pulitzer Prize in History for *Frederick Douglass: Prophet of Freedom*.

Emily Carter (Princeton University) received the 2019 Distinguished Alumni Award from the California Institute of Technology.

Raj Chetty (Harvard University) was named a 2019 Andrew Carnegie Fellow.

Andrew Delbanco (Columbia University; Teagle Foundation) was awarded the Mark Lynton History Prize and a 2019 Anisfield-Wolf Book Award for *The War Before the War: Fugitive Slaves and the Struggle for America's Soul from the Revolution to the Civil War*.

JoAnn Falletta (Buffalo Philharmonic Orchestra) won a Grammy Award for best classical compendium for "Fuchs: Piano Concerto 'Spiritualist'; Poems of Life; Glacier; Rush."

Jeff Gelles (Brandeis University) received the Kazuhiko Kinoshita Award in Single-Molecule Biophysics from the Biophysical Society.

Lila Gierasch (University of Massachusetts Amherst) received the American Peptide Society's Merifield Award.

Paul Gilroy (Kings College London) was awarded the Holberg Prize by the government of Norway.

Gabriela González (Louisiana State University) is the recipient of the 2019 Southeastern Conference Faculty Achievement Award.

Linda Greenhouse (Yale Law School) has been elected an Honorary Bencher of the Middle Temple (London).

Michael Greenstone (University of Chicago) was named a 2019 Andrew Carnegie Fellow.

Laura Haas (University of Massachusetts Amherst) is the recipient of the 2019 IEEE Computer Society's Computer Pioneer Award.

Christopher Hacon (University of Utah) has been elected to the Royal Society of London.

Joseph Halpern (Cornell University) was elected a member of the National Academy of Engineering.

Stephen Harrison (Harvard Medical School) received the 48th Rosenstiel Award for Distinguished Work in Basic Medical Research, given by Brandeis University.

Daniel Hartl (Harvard University) is the recipient of the 2019 Genetics Society of America Thomas Hunt Morgan Medal.

Geoffrey Hinton (University of Toronto) is the recipient of the Association for Computing Machinery's Turing Award. He shares the prize with Yann LeCun (New York University) and Yoshua Bengio (University of Montreal).

Susan Band Horwitz (Albert Einstein College of Medicine) is the recipient of the 2019 Canada Gairdner International Award.

David Huse (Princeton University) was named a 2019 Simons Fellow in Theoretical Physics.

David Jerison (Massachusetts Institute of Technology) was awarded a 2019 Guggenheim Fellowship.

Edward P. Jones (Washington, D.C.) was elected to the American Academy of Arts and Letters.

Carl June (University of Pennsylvania Perelman School of Medicine) received the Edward Netter Leadership Award, given by the Alliance for Cancer Gene Therapy.

Victor Kac (Massachusetts Institute of Technology) was named a 2019 Simons Fellow in Mathematics.

Renata Kallosh (Stanford University) was named a 2019 Simons Fellow in Theoretical Physics.

Jacqueline King (University of the Western Cape, South Africa) was awarded the 2019 Stockholm Water Prize.

Sergiu Klainerman (Princeton University) was named a 2019 Simons Fellow in Mathematics.

Margaret Levi (Stanford University) is the recipient of the 2019 Johan Skytte Prize in Political Science.

Andrei Linde (Stanford University) was named a 2019 Simons Fellow in Theoretical Physics.

Jane Lubchenco (Oregon State University) was elected to the Pontifical Academy of Sciences. She also received the inaugural Tethys Award from the Ocean Visions Institute.

Mark Mangel (University of California, Santa Cruz) received the Outstanding Achievement Award of the American Institute of Fishery Research Biologists.

Eve Marder (Brandeis University) received the 2019 NAS Award in the Neurosciences, given by the National Academy of Sciences.

Suzanne Mettler (Cornell University) was awarded a 2019 Guggenheim Fellowship.

Meredith Monk (The House Foundation for the Arts) was elected to the American Academy of Arts and Letters.

Joseph S. Nye Jr. (Harvard Kennedy School) received the Sakıp Sabancı International Research Awards' Jury Prize.

Robert B. Pippin (University of Chicago) was awarded a 2019 Guggenheim Fellowship.

Richard Powers (Stanford University) won a 2019 Pulitzer Prize in Fiction for *The Overstory*.

Rebecca Richards-Kortum (Rice University) was inducted into the National Inventors Hall of Fame.

Geraldine Richmond (University of Oregon) received the Linus Pauling Legacy Award from Oregon State University.

Mendel Rosenblum (Stanford University) is the recipient of the inaugural ACM Charles P. "Chuck" Thacker Breakthrough in Computing Award.

Christine Seidman (Harvard Medical School) is the recipient of the 2019 Vanderbilt Prize in Biomedical Science.

Laurence Senelick (Tufts University) received the Historic Boston 2018 award for collecting works on paper.

Johannes Sjöstrand (University of Bourgogne) was awarded the 2018 Bergman Prize.

Linda Smith (Indiana University) received the 2019 Norman Anderson Lifetime Achievement Award from the Society of Experimental Psychologists.

Michael Snyder (Stanford University) is the recipient of the 2019 Genetics Society of America George W. Beadle Award.

Timothy Springer (Harvard Medical School) is the recipient of the 2019 Canada Gairdner International Award.

Bruce Stillman (Cold Spring Harbor Laboratory) is the recipient of the 2019 Canada Gairdner International Award.

Natasha Trethewey (Northwestern University) was elected to the American Academy of Arts and Letters.

Richard Tuck (Harvard University) was awarded a 2019 Guggenheim Fellowship.

Ronald Vale (University of California, San Francisco) is the recipient of the 2019 Canada Gairdner International Award.

Lothar von Falkenhausen (University of California, Los Angeles) was awarded a 2019 Guggenheim Fellowship.

David Walt (Brigham and Women's Hospital; Harvard Medical School; Wyss Institute at Harvard University) was inducted into the National Inventors Hall of Fame.

Clifford M. Will (University of Florida) has been awarded the 2019 Albert Einstein Medal by the Albert Einstein Society in Berne, Switzerland.

Eli Yablonoitch (University of California, Berkeley) was awarded the 2019 Frederic Ives Medal/Jarus W. Quinn Prize by the Optical Society.

Adam Zagajewski (University of Chicago) was elected to the American Academy of Arts and Letters.

New Appointments

Angela Belcher (Massachusetts Institute of Technology) was named head of the Department of Biological Engineering at MIT.

Jeffrey Bluestone (University of California, San Francisco) has been appointed to the Board of Directors of Provention Bio, Inc.

Mariano-Florentino Cuéllar (Supreme Court of California) was elected as a member of the Harvard Corporation.

Pietro De Camilli (Yale School of Medicine) has been appointed to the Scientific Advisory Board of Casma Therapeutics, Inc.

Thelma Golden (The Studio Museum in Harlem) was elected to the Board of Trustees of the Andrew W. Mellon Foundation.

Andrea J. Goldsmith (Stanford University) has been appointed to the Board of Directors of Medtronic.

Edward W. Kolb (University of Chicago) was named Director of the Kavli Institute for Cosmological Physics at the University of Chicago.

Glenn D. Lowry (Museum of Modern Art) was appointed to the Board of Directors of the Robert Rauschenberg Foundation.

Daniel Mendelsohn (New York, NY) was named Editor-at-Large of *The New York Review of Books*.

Indra Nooyi (PreeTara LLC) was named to the Board of Directors of Amazon.

Robert Schreiber (Washington University School of Medicine in St. Louis) was appointed to the Immuno-Oncology Advisory Board of Sensei Biotherapeutics, Inc.

Oscar Tang (New York, NY) was elected Cochair of the Board of Directors of the Philharmonic-Symphony Society of New York.

Jay Xu (Asian Art Museum of San Francisco) has been appointed to the Board of the Terra Foundation for American Art.

Select Publications

Poetry

Arthur Sze (Institute of American Indian Arts). *Sight Lines*. Copper Canyon Press, April 2019

Fiction

Ann Beattie (York, ME). *A Wonderful Stroke of Luck*. Viking, April 2019

Ian McEwan (London, United Kingdom). *Machines Like Me*. Nan A. Talese, April 2019

Nonfiction

Robert Alter (University of California, Berkeley). *The Art of Bible Translation*. Princeton University Press, March 2019

Robert J. Barro (Harvard University) and Rachel M. McCleary (Harvard University). *The Wealth of Religions: The Political Economy of Believing and Belonging*. Princeton University Press, May 2019

Carles Boix (Princeton University). *Democratic Capitalism at the Crossroads*. Princeton University Press, May 2019

David Bromwich (Yale University). *How Words Make Things Happen*. Oxford University Press, May 2019

Robert A. Caro (New York, NY). *Working: Research, Interviewing, Writing*. Penguin Random House, April 2019

Nicholas A. Christakis (Yale University). *Blueprint: The Evolutionary Origins of a Good Society*. Little, Brown and Company, March 2019

Patricia Churchland (University of California, San Diego). *Conscience: The Origins of Moral Intuition*. W.W. Norton, June 2019

Thomas Crow (New York University), Melissa Ho (Smithsonian American Art Museum), Mignon Nixon (University College London), Erica Levin (Ohio State University), and Martha Rosler (American artist and author). *Artists Respond: American Art and the Vietnam War, 1965–1975*. Princeton University Press, April 2019

Philip J. Deloria (Harvard University). *Becoming Mary Sully: Toward an American Indian Abstract*. University of Washington Press, April 2019

Daniel Dennett (Tufts University), Christopher Hitchens† (Houston, TX), Richard Dawkins (The Royal Society), and Sam Harris (Project Reason). *The Four Horsemen: The Conversation That Sparked an Atheist Revolution*. Random House, March 2019

Frans de Waal (Emory University). *Mama's Last Hug: Animal Emotions and What They Tell Us About Ourselves*. W.W. Norton, March 2019

Jared Diamond (University of California, Los Angeles). *Upheaval: Turning Points for Nations in Crisis*. Little, Brown and Company, May 2019

Jennifer L. Eberhardt (Stanford University). *Biased: Uncovering the Hidden Prejudice That Shapes What We See, Think, and Do*. Viking Press, March 2019

Patricia Buckley Ebrey (University of Washington) and Paul Jakov Smith (Haverford College), eds. *State Power in China, 900–1325*. University of Washington Press, March 2019

Melinda Gates (Bill & Melinda Gates Foundation). *The Moment of Lift: How Empowering Women Changes the World*. Flatiron Books, April 2019

John Stratton Hawley (Barnard College), Christian Lee Novetzke (University of Washington), and Swapna Sharma (Yale University), eds. *Bhakti and Power: Debating India's Religion of the Heart*. University of Washington Press, May 2019

Susan Hockfield (Massachusetts Institute of Technology). *The Age of Living Machines: How Biology Will Build the Next Technology Revolution*. W.W. Norton, May 2019

Margaret C. Jacob (University of California, Los Angeles). *The Secular Enlightenment*. Princeton University Press, April 2019

William Chester Jordan (Princeton University). *The Apple of His Eye: Converts from Islam in the Reign of Louis IX*. Princeton University Press, April 2019

Thomas Forrest Kelly (Harvard University). *The Role of the Scroll: An Illustrated Introduction to Scrolls in the Middle Ages*. W.W. Norton, April 2019

Alison Lurie (Cornell University). *Words and Worlds: From Autobiography to Zippers*. Delphinium, May 2019

Jodi Magness (University of North Carolina, Chapel Hill). *Masada: From Jewish Revolt to Modern Myth*. Princeton University Press, May 2019

David McCullough (West Tisbury, MA). *The Pioneers: The Heroic Story of the Settlers Who Brought the American Ideal West*. Simon & Schuster, May 2019

Bill McKibben (Middlebury College). *Falter: Has the Human Game Begun to Play Itself Out?* Henry Holt and Co., April 2019

Anna Quindlen (New York, NY). *Nanaville: Adventures in Grandparenting*. Random House, April 2019

Jennifer Ratner-Rosenhagen (University of Wisconsin-Madison; Academy Visiting Scholar, 2005–2006). *The Ideas That Made America: A Brief History*. Oxford University Press, February 2019

Nancy L. Rosenblum (Harvard University) and Russell Muirhead (Dartmouth College). *A Lot of People Are Saying: The New Conspiracism and the Assault on Democracy*. Princeton University Press, April 2019

Robert I. Rotberg (Harvard Kennedy School), ed. *Corruption in Latin America: How Politicians and Corporations Steal from Citizens*. Springer Nature, November 2019

Thomas D. Seeley (Cornell University). *The Lives of Bees: The Untold Story of the Honey Bee in the Wild*. Princeton University Press, May 2019

Laurence Senelick (Tufts University), trans. *Two Plays of Weimar Germany: Youth Is a Sickness and Criminals* by Ferdinand Bruckner. Northwestern University Press, September 2018

John Paul Stevens (Supreme Court of the United States). *The Making of a Justice: Reflections on My First 94 Years*. Little, Brown and Company, May 2019

Steven Strogatz (Cornell University). *Infinite Powers: How Calculus Reveals the Secrets of the Universe*. Houghton Mifflin Harcourt, April 2019

Susan Treggiari (Oxford, United Kingdom). *Servilia and Her Family*. Oxford University Press, March 2019

Lawrence Weschler (*The New Yorker*). *And How Are You, Dr. Sacks? A Biographical Memoir of Oliver Sacks*. Farrar, Straus and Giroux, August 2019

Avi Wigderson (Institute for Advanced Study). *Mathematics and Computation*. Princeton University Press, April 2019

Edward O. Wilson (Harvard University). *Genesis: The Deep Origin of Societies*. Liveright, March 2019

We invite all Fellows and International Honorary Members to send notices about their recent and forthcoming publications, scientific findings, exhibitions and performances, films and documentaries, and honors and prizes to bulletin@amacad.org. ■

† Deceased

Remembrance

*It is with sadness that the Academy notes the passing of the following Members.**

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John F. Ahearne	John M. Darley	John Walley Littlefield	John Shipley Rowlinson
Paul Gardner Allen	David Brion Davis	Laszlo Lorand	Robert Ryman
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