Molecule-making machine simplifies complex chemistry

By Liz Ahlberg
Physical Sciences Editor

A new molecule-making machine could do for chemistry what 3-D printing did for engineering. Make it fast, flexible and accessible to anyone.

Chemists at the U of I, led by chemistry professor and medical doctor Martin D. Burke, built the machine to assemble complex small molecules at the click of a mouse, like a 3-D printer at the molecular level. The automated process has the potential to greatly speed up and enable new drug development and other technologies that rely on small molecules.

“We wanted to take a very complex process, chemical synthesis, and make it simple,” said Burke, a Howard Hughes Medical Institute Early Career Scientist. “Simplicity enables automation, which, in turn, can broadly enable discovery and bring the substantial power of making molecules to nonspecialists.”

The researchers described the technology in a paper featured on the cover of the March 13 issue of Science.

“Small molecules” are a specific class of complex, compact chemical structures found throughout nature. They are very important in medicine – most medications available now are small molecules – as well as in biology as probes to uncover the inner workings of cells and tissues. Small molecules also are key elements in technologies like solar cells and LEDs.

However, small molecules are notoriously difficult to make in a lab. Traditionally, a highly trained chemist spends years trying to figure out how to make each one before its function can even be explored, a slowdown that hinders development of small-molecule-based medications and technologies.

“Up to now, the bottleneck has been synthesis,” Burke said. “There are many areas where progress is being slowed, and many molecules that are pharmaceutical or medical companies aren’t even worked on.”

In This Issue

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Acclaimed musician Gilberto Gil, a winner of multiple Grammy and Latin Grammy awards, will lecture and perform April 1.

Civil conflict
New research has shown that development aid can exacerbate violence in war-torn countries.

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Vital sign
Chancellor Phyllis M. Wise makes a point to trustees during the March 12 board meeting in Urbana. The board would later accept a recommendation from President Bob Easter giving Wise permission to proceed with the creation of a new campus medical school – a faculty-driven idea she started championing more than a year ago. The new engineering-intensive school will be created through a $150 million partnership with Carle Health System. Its financial plan excludes state tax revenue.

“The goals must be to advance the aspirations of each campus, while creating the current infrastructure for medical education and research at the university,” Easter said. He promised a “collaborative and synergistic” partnership with UIC that ultimately will represent a single strategic vision, which will be guided by incoming president Timothy K. Raterman, whose perspective was included in Easter’s review.

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President Killeen to begin U. of I. strategic plan work

By Mike Helenthal

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MARJORIE GAMEL, an administrative aide in the physics department and a former U.S. Air Force member, has worked several jobs at the U. of I. since she was hired in 1983. She and her husband met while they were stationed at Chanute Air Force Base in Rantoul, Illinois, and they liked the area so much they stayed and raised a family.

By Mike Helenthal
Assistant Editor

Marjorie Gamel, an administrative aide in the physics department and a former U.S. Air Force member, still performs her job requiring many different skills and plenty of teamwork.

"I became interested in the military while I was in junior high school," she said. "My brother had been drafted in the Vietnam era, and I did a lot of reading about the military before going in."

I. left the Air Force in 1980 and was hired by her husband’s former employer, the University of Illinois, as an administrative aide in the College of Liberal Arts and Sciences.

"I think we are taking risks, but they are mitigated risks," she said. "Employees have until May 31, the end of the legislative session, to contact elected state legislators before March 19, when appropriations hearings on the university’s fiscal 2016 budget allocation are held in the Illinois House and Senate."

The legislative session is scheduled to run through May. Employees have until May 31, the end of the legislative session, to contact elected leaders.

The new fiscal year begins July 1. University officials have said they will be looking at a budget proposal submitted by new Gov. Bruce Rauner in February that called for a 31.5 percent cut in higher education funding."

"Between the three campuses, the U. of I. touches a lot of lives in this state," she said. "We get to be grandma all of the time, and we have a relationship with them."

Marjorie Gamel, an administrative aide in the physics department and a former U.S. Air Force member, still performs her job requiring many different skills and plenty of teamwork.

That led to another position in the physics department left, and she was asked to return to aid in the transition.

Gamel met her husband, Hank, who also went to flight school in 1980 and was stationed at Chanute Air Force Base in Rantoul, Illinois. That team feeling returned in 1985 after she took a job in the physics department that had her working in the busy print shop.

It was a pre-computer and paper-intensive job requiring many different skills and plenty of teamwork.

"I used to be buried alive in paperwork," she said. "Now it’s all electronic. It’s wonderful. It’s nice that I don’t have to come in campus anymore just to get a signature."

"I’ve never not liked a job I’ve had here," she continued. "I get to be grandma all of the time, and we have a relationship with them."
Helium recycling initiative lights financial burden

By Austin Keating
News Bureau Intern

T
e two U. of I. professors have been elected fellows of the American Academy of Microbiology.

Steven Blanke, professor of animal sciences at the University of Wisconsin-Madison, and Bryan White, a professor of animal sciences at the University of Illinois at Urbana-Champaign, have been elected fellows of the American Academy of Microbiology.

The American Academy of Microbiology (AAM) is the largest professional society for microbiologists, with more than 30,000 members in 145 countries. Fellows are elected by their peers for having made significant contributions to the science of microbiology.

Blanke was elected for his research on the genetics and physiology of enteric bacteria, which cause digestive disorders and other infections in humans and animals. His research has focused on the use of enteric bacteria to deliver antimicrobial and immunomodulatory agents to treat and prevent diarrheal diseases.

White was elected for his research on the role of the human microbiome in health and disease. His research has focused on the use of probiotics and prebiotics to improve human health and prevent disease.

Both Blanke and White have made significant contributions to the field of microbiology, and their election as fellows of the American Academy of Microbiology is a testament to their excellence and dedication to the science.

PAGE 4  Illinois among top producers of Fulbright Students, Scholars

The U. of I.’s Urbana campus has a strong record as a “Top Producer” of U. of I. students who are awarded Fulbright Scholarships, according to a report in the Chronicle of Higher Education.

The report ranks the top 150 U.S. universities in the number of faculty members receiving the prestigious award, and the University of Illinois ranks No. 5 among U.S. research institutions in the number of faculty members receiving the prestigious award in support of their research and creative activities.

In addition, the report notes that the University of Illinois has more than 2,400 students abroad each year, allowing them to gain international experience and contribute to finding solutions to global problems.

The Fulbright Program, established in 1946, is one of the largest programs of international educational exchange in the world. It provides opportunities for students and scholars to engage in cultural and professional development through the exchange of persons and ideas.

The University of Illinois is committed to fostering a diverse and inclusive community that values and promotes the sharing of ideas and the exchange of cultures.

The University of Illinois is proud to be a leader in the Fulbright Program and to provide its students with the opportunity to gain international experience and contribute to finding solutions to global problems.
Historian traces the making of samba in Brazil

By Craig Chamberlain
Social Sciences Editor

The U.S. and Brazil have a few things in common. Both are continent-spanning nations that began as European colonies. Both have a history of African slavery. And both developed iconic music with strong roots in their respective black communities.

In the U.S., that music was jazz. In Brazil, it was samba.

At one time, samba was Brazil’s “uncontested national music,” according to Marc Hertzman, a U. of I. professor of Latin American history. Its influence continues today, most prominently in a form of it that powers Brazil’s annual carnival celebrations.

“Samba was understood by many people as a unique combination of African and European, and as a symbol of Brazil’s racial heritage,” Hertzman said. The symbol was all the more powerful, he said, because Brazil over the last century has often been touted as a “racial paradise” – free, for instance, of the enforced segregation and restrictive racial categories once found in the United States.

Music and race are the central themes of Hertzman’s 2013 book “Making Samba,” which traces the history of Brazil’s original samba, from an Afro-Brazilian Rio de Janeiro neighborhood early in the 20th century, through its golden age (roughly 1929-45) and into the 1970s.

In writing the book, Hertzman said he wanted to explore how Brazil went from a society that ended slavery in 1888 – the last country in the Western Hemisphere to do so – to a society that a few decades later was celebrating what was “ostensibly black music.” He also wanted to explore “how the musicians themselves go from being property to owning property (namely in the rights to their music).”

He found that the black composers and performers of samba had many successes, but also faced a number of challenges – often at the height of success – in a “complex and oppressive racial system.”

“It’s a story that runs counter to the narrative of Brazil as being radically different from the U.S. in its racial history, as a ‘racial paradise where everybody gets along,'” Hertzman said.

One example of that today, Hertzman believes, can be found in the life and career of Gilberto Gil, an Afro-Brazilian musician who also served as Brazil’s minister of culture from 2003 to 2008 – and who will lecture and perform at the U. of I. on April 1.

Gil is “one of the most successful, popular and renowned musicians of the second half of the 20th century in Brazil, for sure,” Hertzman said. And yet he faced severe attacks as the minister of culture, at one point being called the “barbarian minister,” Hertzman said.

Gil held controversial views on sharing music and other intellectual property through the Creative Commons, and that was one reason for the “harsh blowback,” Hertzman said, but he believes it went beyond that. The attacks also showed “what it means to be a prominent, public man of color (in Brazil) doing something a little bit daring.”

Grammy-winning Brazilian musician featured April 1

Acclaimed musician Gilberto Gil, a winner of multiple Grammy and Latin Grammy awards, and a former Brazilian minister of culture, will lecture and perform at 5 p.m. April 1 in the Foellinger Great Hall at Krannert Center for the Performing Arts.

The event is free and open to the public.

Gil is a singer, guitarist and composer who has recorded more than 50 albums. His music ranges from the baião of northeastern Brazil to reggae, psychedelia, bossa nova, electronica, samba and rock. He was fundamental in the development and spread in the 1960s of tropicália, a movement to assimilate pop culture and national genres, and he continues to be a force in both politics and musical innovation. He also has served as a UNESCO Artist for Peace.

Gil will lecture on the topic of music and Brazilian culture, and then perform.

The event is sponsored by The Lemann Institute for Brazilian Studies, with additional support from the Center for Latin American and Caribbean Studies, Krannert Center, the Center for Historical Interpretation and the department of history.

More about Gil can be found at his website.
2014 CAMPUS CHARITABLE FUND DRIVE

Designated Levels of Giving Donors

We want to acknowledge some members of the campus community who contributed to the success of last year’s Campaign with an updated list. This list was compiled from payroll and fund-drive records at the end of the 2014 Campus Charitable Fund Drive. We apologize for any incorrect text in the previous ad.

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More older adults from U.S. volunteering in other countries

By Sharita Forrest
Social Work Editor

Nearly 290,000 older adults from the U.S. volunteered abroad during 2012—an increase of more than 40 percent in less than a decade, a recent study found.

A growing number of adults age 55 and older are interested in performing volunteer work in other countries. "Younger and mid-life baby boomers in local labor markets, according to research- ers Benjamin J. Lough and Xiaoling Xiang of the University of Illinois.

"Older research shows true flexible work arrangements—ones that give the worker autonomy and flexibility on when, where and how the job is done—are as effective as the voluntary change in BMI over time, is negatively affected by an increase in work hours and the birth of additional children. "While the effects of work and family demands on BMI are small, they are statistically and practically significant," Kramer said. "Medical studies have consistently shown that even small changes in BMI have a negative impact on health outcomes such as coronary heart disease, diab etes and lung functioning, to name a few." Such effects occur when an increase in the demands of one's work leaves the family with less time to engage in health-promoting behavior such as exercising, eating healthy and sleeping. It's also possible that the strain associated with an increased workload is related to increased BMI, the researchers said.

"The paper also considered whether the availability of flexible work arrangements had a moderating effect on the relationship between work demands and physical health. The results indicate that flexible work arrangements had no effect on BMI, most likely because reducing one's BMI requires actual behavioral changes—more sleep and exercise, for example. But just because flexible work arrangements have no effect on BMI doesn't mean that employers should shed the perk, Kramer says.

"Our research shows that flexible work arrangements—ones that give the worker autonomy and flexibility on when, where and how the job is done—are as effective as the voluntary change in BMI over time, is negatively affected by an increase in work hours and the birth of additional children. "While the effects of work and family demands on BMI are small, they are statistically and practically significant," Kramer said. "Medical studies have consistently shown that even small changes in BMI have a negative impact on health outcomes such as coronary heart disease, dia betes and lung functioning, to name a few." Such effects occur when an increase in the demands of one's work leaves the family with less time to engage in health-promoting behavior such as exercising, eating healthy and sleeping. It's also possible that the strain associated with an increased workload is related to increased BMI, the researchers said.

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Tropical fire ants traveled the world on 16th-century ships

By Diana Yates  
Life Sciences Editor

There’s a bit of genetic sleuthing, researchers now know the invasion history of the tropical fire ant (Solenopsis geminata), the first ant species known to travel the globe by sea. Their study, reported in the journal Molecular Ecology, reveals that 16th-century Spanish galleons shuttled tropical fire ants from Acapulco, Mexico, across the Pacific to the Philippines, and from there to other parts of the world. Today, the ant species is found in virtually all tropical regions of the world. Andrew Suarez, professor of entomology at the University of Illinois at Urbana-Champaign and his colleagues used genetics to retrace the invasion history of the tropical fire ant.

They looked at the ants, particularly if they were going somewhere to pick up commerce, would fill their ballast with soil and then they would dump the soil out in a new port and replace it with cargo,” said U. of I. entomologist and animal biology professor Sara Helms Cahan, former UVM graduate student Heather Axen (now a graduate student at Salve Regina University). There wasn’t a mechanism for ballast water. So the ants made their way to a port in the Americas, the Caribbean, and that population then went to the New World in the mid-1600s.

If you look at the records, you look at it in this context, particularly old trading routes and you look at the genetics, it all paints this picture that this was one of the first global invasions, and it coincided with what could be the first global trade pattern of the Spanish,” Suarez said. The ants from the introduced areas in the Old World are genetically most similar to ants from southwestern Mexico, suggesting that their source population came from this region.

The researchers were able to date the ants’ invasion of the Old World to the 16th century. At this time, the Spanish had just established a regular trade route between Acapulco and Manila. Philippine, not only setting up the first trade route across the Pacific Ocean but also effectively globalization commerce.

“Acapulco was a big stopping point for the Spanish,” Suarez said. “From there, Spanish galleons brought silver to Manila, which served as a hub for trade with China.”

The researchers hypothesized that the original ant population was able to repopulate the Americas in the mid-1600s before they moved to other parts of the world. And that is what they found.

There was this very clear pattern where there was the most genetic diversity in the New World, where it’s native, and then you see these stepping stones of nested subsets of diversity as you move away from the New World into the Old World,” Suarez said. And the pattern of genetic changes over time “always overlaps the timing of when the Spanish trade was going on,” he said.

“We’re now starting to realize that this can also sometimes create a correlated response where they also prefer members of their own species that they can hybridize with,” Fuller said.

Fish that avoid mating with related species also shun own

A new study offers insight into a process that could lead one species to diverge into two, researchers report in The American Naturalist. The study found that female killifish that avoid mating with males of a closely related species also avoid mating with males of their own species— if those males come from a unfamiliar population.

This phenomenon, called cascade reinforcement, has been observed in insects and amphibians. New studies in fish, said U. of I. animal biology professor Rebecca Fuller, who led the new analysis. Reinforcement can occur when from those other parts of the environment mate and produce inferior, hybrid offspring. Fish that mate with other species have fewer offspring that live to adulthood, while fish that mate only within their own species are likely to have more descendants in future generations. A possible consequence of this process of natural selection occurs when females that avoid mating with other species take their choosiness one step further—also shunning potential mates of potential mates from their own species, Fuller said.

“A process that benefits the fish in one context—avoiding mating with another species—bleeds over into a different context, which may or may not be beneficial,” she said.

The new study looked at male preferences in two species: rain- genetic killifish (Lacustris cervi) and bluefin killifish (Lucania parva). These small, adaptable fish sometimes share a habitat and can mate and produce offspring. L. parva live in marine, freshwa- ter and brackish habitats, while L. parva prefer fresh water but can tolerate brackish waters. Previous studies have shown that when L. parva and L. goodei share a habitat, males and females prefer mates of their own species. And that is what they found.

“We’ve known for a good 20 years that there’s selection for animals to have particularly strong preferences for mates of their own species when they co-occur in the same environments,” Fuller said. “We’ve seen a lot of research that shows how this can happen in other species.”

Animal behavior U. of I. animal biology professor Rebecca Fuller and her colleagues found that killifish females that learn to avoid mating with other species also discriminate among members of their own species.

“We’re now starting to realize that this can also sometimes create a correlated response where they also prefer members of their own species that are from their own population. And this may lead to the early stages of speciation. It may start the speciation process.”

More research must be done to establish that such preferences can lead to the advent of new species, but the findings add to the evidence that “biodiversity begets biodiversity,” Fuller said.

The National Science Foundation supported this research. ◆

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This phenomenon, called cascade reinforcement, has been observed in insects and amphibians. New studies in fish, said U. of I. animal biology professor Rebecca Fuller, who led the new analysis. Reinforcement can occur when from those other parts of the environment mate and produce inferior, hybrid offspring. Fish that mate with other species have fewer offspring that live to adulthood, while fish that mate only within their own species are likely to have more descendants in future generations. A possible consequence of this process of natural selection occurs when females that avoid mating with other species take their choosiness one step further—also shunning potential mates of potential mates from their own species, Fuller said.

“A process that benefits the fish in one context—avoiding mating with another species—bleeds over into a different context, which may or may not be beneficial,” she said.

The new study looked at male preferences in two species: rain- genetic killifish (Lacustris cervi) and bluefin killifish (Lucania parva). These small, adaptable fish sometimes share a habitat and can mate and produce offspring. L. parva live in marine, freshwa- ter and brackish habitats, while L. parva prefer fresh water but can tolerate brackish waters. Previous studies have shown that when L. parva and L. goodei share a habitat, males and females prefer mates of their own species. And that is what they found.

“We’ve known for a good 20 years that there’s selection for animals to have particularly strong preferences for mates of their own species when they co-occur in the same environments,” Fuller said. “We’ve seen a lot of research that shows how this can happen in other species.”

Animal behavior U. of I. animal biology professor Rebecca Fuller and her colleagues found that killifish females that learn to avoid mating with other species also discriminate among members of their own species.

“We’re now starting to realize that this can also sometimes create a correlated response where they also prefer members of their own species that are from their own population. And this may lead to the early stages of speciation. It may start the speciation process.”

More research must be done to establish that such preferences can lead to the advent of new species, but the findings add to the evidence that “biodiversity begets biodiversity,” Fuller said.

The National Science Foundation supported this research. ◆
Although development aid is commonly seen as an important tool in the quest to reduce poverty in conflict-riven countries, new research co-written by a U. of I. expert in development economics concludes that large-scale foreign aid programs can backfire and actually exacerbate violence in some long-running conflicts.

An analysis of data from 2002-06 of a major government-sponsored development program in the Philippines suggests that an influx of aid caused a spike in casualties in municipalities in the country’s long-running, low-level civil conflict, but did not affect the levels of violence associated with armed criminal groups that lacked political motivation, says Benjamin Crost, a professor of agricultural and consumer economics at Illinois.

“It turns out that an unintended consequence of development aid is that, in the war for hearts and minds, insurgents have a strong incentive to pre-empt a successful program from coming in,” he said.

The paper estimated the aid program’s effect on violence by studying the eligibility for the program, which was restricted to the poorest 25 percent of municipalities in participating Philippine provinces. The eligibility criteria created a discrete cutoff point to compare the number of casualties in municipalities just above and just below the poverty threshold, Crost said.

“Normally, it’s very difficult to estimate the effect of the flow of aid because it often comes in response to something,” he said. “What makes our research unique is that we have this cutoff where aid was targeted. If you were to compare places that received a lot of aid with places that didn’t, and find that the ones that got a lot of aid are more violent, that doesn’t really tell you anything. What makes the paper unique is that we have this novel way of getting around it at the margin.”

The implementing agency generated a poverty index and ranked municipalities from richest to poorest within each province, with only the poorest 25 percent of municipalities eligible to receive aid.

“That allowed us to really compare like with like,” Crost said.

According to the paper, after the program’s start, barely eligible municipalities experienced a large and statistically significant increase in casualties compared with barely ineligible ones.

“In other words, a municipality at the 25th percentile for poverty was markedly more violent than one at the 26th percentile, even though they’re both broadly similar in poverty levels and other factors that affect conflict,” Crost said.

“With all observable characteristics, they’re basically the same – except that municipalities eligible for aid became markedly more violent,” Crost said. “Comparing them allowed us to isolate the causal effect of aid on conflict.”

According to the paper, the increase in violence was concentrated in the development program’s early stages, before funds were disbursed and before eligible municipalities committed to participating in the program.

“The uptick in violence is all concentrated in the six months after local governments find out if they’re going to get aid, but it’s happening well before the resources actually come through,” Crost said. “So it’s not simply a matter of the insurgents grabbing the money, because we see the violence go up before any money starts to flow to municipalities.”

The effect was strongest for casualties suffered by government forces as a result of insurgent-initiated attacks. The hypothesis in the paper is that the developmental aid poses a threat to the insurgents, Crost said.

“The insurgents don’t want the aid to come at all, because they don’t want the government to have a success story,” he said. “They don’t want citizens to think that the government is trying to do something good for them, because that might undermine support for the insurgents. It all goes back to the idea of winning hearts and minds. If people think the government is doing something to help the population, then they’ll stop supporting the insurgents.”

What makes the Philippines interesting is that the country has a long-simmering civil conflict but “it’s not like Iraq and Afghanistan, where in certain places it’s so violent that it’s basically impossible for humanitarian organizations to operate,” he said.

For aid organizations, the challenge becomes how to help without exacerbating regional violence.

“What that means for policymakers is that if foreign aid isn’t necessarily bad, it’s just not as effective at reducing conflict as a lot of people were hoping it would be,” Crost said. “Is there a way to give aid without increasing conflict? There’s very little research on that. Maybe cooperating or coordinating with security forces – but in certain circumstances, you don’t want aid agencies aligning themselves with security forces. You don’t want aid agencies being seen as part of a counterinsurgency effort.”

The paper was published in the American Economic Review and was co-written by Joseph Felter of Stanford University and Patrick Johnston of the Rand Corp.
Civil service recommendations discussed at public hearings

By Christy Levy
UC NEWS

The state’s civil service statutes should be changed to provide a more diverse applicant pool and greater flexibility in exempting certain positions from civil service classification, university administrators said at a hearing on March 13 at U of I on the Urbana-Champaign campus.

University administrators and faculty and staff members spoke in support of five recommendations compiled by human resources directors from all Illinois public universities. The recommendations were presented in November to University Civil Service Merit Board chairman James Montgomery, a U of I trustee. (The Merit Board is the governing body of the State Universities Civil Service System.)

A subcommittee of Merit Board trustees – chaired by university trustee Karen Hasara – hosted two hearings on the recommendations, one in Urbana on March 11 and the other at U of I on March 13 with a videoconference for speakers in Urbana.

The state’s civil service statutes – written in the 1950s – should be updated, said Maureen Parks, the executive director and associate vice president of human resources.

“If the language is not taken out, the state universities will continue to have substantial audit findings for misclassification,” she wrote. “It will be virtually impossible for a university to exempt a person from civil service and this will significantly impact the flexibility needed for our campuses to function efficiently.”

Their recommendations:

- Remove language that requires a position to be designated civil service if its description matches the specifications for a civil service classification, and that assumes all positions are civil service unless exempted by statute.
- Create an audit procedures manual and a three-year audit cycle, rather than a two-year cycle.
- Modify scoring criteria to increase the diversity and size of the candidate pool referred for a position.
- Modify the criteria for out-of-state recruiting for civil service positions.
- Provide flexibility for campus human resources offices to approve “specialty factors” that enhance minimum qualifications in the classification specifications, which sometimes are outdated.

Umbra Chancellor Phyllis M. Wise urged the Merit Board to accept the recommendations and meet with human resources directors from public universities to discuss the proposed changes. The Merit Board will consider the recommendations at its May 20 meeting in Urbana.

The changes would improve the civil service hiring process, Wise said, but there’s still a need for employees to fill other job classifications.

“These changes do not diminish our need for academic professionals,” she said. “Our workforce is complex. That means we need people in many job classifications.”

Umbra faculty member Matthew Wheel-er said he was “seriously concerned” about the language in the civil service statutes that
How central was slavery to the Confederate cause? And to its defeat?

Most, if not all, of the leaders of the secession movement and then of the Confederacy dedicated themselves first and foremost to the preservation of slavery. They then counted upon slaves’ labor to keep their society running and their armies functioning during the war.

But slavery also proved to be the Confederacy’s Achilles’ heel. Slaves welcomed advancing Union armies, provided them with intelligence and material support, escaped from their owners and – by the tens of thousands – later joined Union armies as soldiers. Those black soldiers played a crucial role in achieving the Union’s victory, as Abraham Lincoln acknowledged. In a previous book, “Confederate Emancipation,” you wrote about plans to free and arm slaves near the end of the war. How far did those plans go and how many slaves actually served in the Union army and navy during the war.

You note that there are many misconceptions and myths about what caused the war and why it was fought. Are there similar misconceptions and myths about how the war ended and what it accomplished?

Yes. One of those myths holds that the end of the war and the eventual end of slavery finally put an end to white supremacy and racial discrimination. In fact, the South’s white leadership remained deeply committed to both and fought viciously to retain them long after slavery as such was outlawed.

Another myth puts the blame for post-war racial conflict in the South on the Republicans, who during Reconstruction supposedly set out to persecute southern whites out of vengeance or venality. That Reconstruction plan, so goes this myth, provoked a justifiedly outraged response. But the truth is that congressional Republicans intervened in southern politics and postwar race relations only after the South’s white state governments began gutting the freedoms that black people had just obtained there. White-supremacist groups like the Ku Klux Klan then launched a terrorist campaign to drive most freedpeople back down into a state of semi-slavery/semi-freedom, a condition from which African-Americans emerged of semi-slavery/semi-freedom, a condition from which African-Americans emerged.

In your book, you speculate, but how do you think the post-war history might have been different if Lincoln lived? I do believe in what-if history; I think we engage in it, at least unconsciously, every time we say that such-and-such a fact or development was the essential cause of something else. In this case, I doubt that Abraham Lincoln, had he lived, would have been able to prevent postwar events from playing out substantially as they did.

Lincoln was an exceptionally skillful politician, it’s true. But for all his subtlety and diplomacy, he had never previously been able to charm the South’s white leadership – even in the so-called loyal border states – into deviating from their pro-slavery creed.

I see no reason to believe that he would have had any greater success in overcoming their postwar commitment to preserving white supremacy and black subordination without the use of force. Substantially the same struggle would most likely have occurred.

Historian Bruce Levine on slavery, the Civil War and Lincoln, 150 years later

Editor’s note: The American Civil War came to an end 150 years ago with the Confederate surrender at Appomattox Court House, Virginia, on April 9, 1865. Five days later, President Abraham Lincoln was assassinated. What role did slavery play in the Confederate defeat? And how might history have been different if Lincoln had lived? U. of I. historian Bruce Levine has written extensively about the war and its consequences. His 2013 book, “The Fall of the House of Dixie,” traced how fighting the war transformed the South from within. He spoke with News Bureau social sciences editor Craig Chamberlain.
What is the rationale for treating the Internet as a utility? Some industries perform such a widely essential function that a referee is needed to ensure that they live up to their “duty to serve” – neither discriminating against nor gouging their users. This special status, and the legal and regulatory oversight that derives from it, mark them as public utilities. Public utility industries possess a long-standing legal pedigree, which has been repeatedly renewed so as to cover successive new technologies of transportation and communications – notably, the railroad and the telegraph during the late 19th century. Interstate telecommunications service providers only gained meaningful oversight in 1934, however, with the establishment of the Federal Communications Commission.

Congress ordered the new FCC, as its very first order of business, to undertake a comprehensive investigation of what was then the nation’s largest network operator – the American Telephone and Telegraph Company. The purpose of this unprecedented inquiry, which at its height saw 200 FCC accountants, lawyers, engineers and researchers combing through AT&T’s corporate records, was to clarify what additional public responsibilities needed to be imposed on the carrier. The corporate power of this single company was such that only the federal government was capable of vesting it with a genuine duty to serve the American people. This point remains vital. Because the telecommunications network constitutes the essential infrastructure for the circulation of ideas – whether as Morse code dots and dashes, voice conversations or streams of computer data – the companies that operate this infrastructure bear an enormous public responsibility. The terms on which information flows throughout society are too important to be left to a small group of gigantic, financially self-interested, corporations – at least in a democratic society. Their corporate power over the circulation of ideas means that they must be made, and kept, publicly accountable. Internet service has not been regulated in this way before. Under then-President Richard Nixon, the FCC lifted the louder computer communications services out of the public utility category during the early 1970s. The same exemption was made for Internet service as it developed, and after the Web exploded on the scene during the early-to-mid 1990s. The Internet went on to become, irrefutably, an essential service throughout daily life, and for the conduct of commerce and politics. The Internet also is used today by many more subscribers, proportionately, than was the telephone when the telegraph was made subject to public utility regulation.

How will the regulation of Internet and mobile data service differ from that originally imposed on telephone service under the Communications Act? The short answer is that nobody knows yet. When the majority of FCC commissioners voted to treat broadband Internet service under the rules for telecommunications carriers on Feb. 26, they also stated that they would forbear from exercising some of the powers that they possess under the relevant section of the Communications Act. However, until the FCC publicly releases its decision – which will probably happen in the next few weeks – we won’t know exactly what responsibilities the Commission has mandated. Challenges to the FCC’s decision also are likely – through the courts and/or through Congress – and these might alter the outcome. But a reciprocal point needs to be added. Just as Congress told the FCC to study whether it needed to amplify and extend its regulatory oversight in 1934, today we must consider whether substantial regulation needs to be imposed on giant Internet companies like Google, Facebook, Amazon and Apple. It is arguable that they, in addition to the broadband Internet service providers, wield concentrated corporate power over Internet system development. And there is no doubt that both the proprietary algorithms that structure their services and the tight interlocks they have forged with intelligence agencies require more meaningful public oversight and accountability – in the interest both of privacy protection and democratic self-government. What changes, if any, will consumers notice once the rules are in place? Consumers will be able to be more confident than before that the applications and services they access through the Internet will not be degraded – “throttled” – as a result of the cable and telecom companies’ self-interest, or of the secretive commercial agreements they may sign with large Internet companies. Consumers will also be able to gain greater understanding of policy conflicts in this area, because regulatory oversight signifies that greater publicity will be accorded to them. What would be the potential consequences if cable companies and other providers continued to control, without regulation, how content comes to customers? It is a near-certainty that age-old fears about discrimination will be borne out. We don’t have to look far afield for evidence. The retransmission blackouts and near-blackouts of the past 20 years or so give us good reason to believe that consumers might be held hostage to maneuverings for commercial advantage by big Internet companies. What is your reaction to the argument that regulating Internet and mobile data service will deter investment and undermine innovation in the market? This is a specious argument. After the 1934 Communications Act imposed meaningful regulation on AT&T, both its scale of investment and its role in pioneering innovations actually accelerated. It’s often forgotten that, between the 1940s and the 1970s, the old, regulated AT&T spearheaded the innovation of the transistor, satellites, mobile phones and fiber optics. This was also, not coincidentally, the period during which near-universal access to telephone service came to be enjoyed by U.S. households.

Telecommunications expert Daniel Schiller on Net Neutrality

Editor’s note: The Federal Communications Commission voted Feb. 26 to regulate broadband Internet service as a public utility. The “net neutrality” rules aim to ensure open Internet access. Daniel Schiller, an emeritus professor of library and information science at the U. of I., talked with News Bureau arts and humanities editor Jodi Heckel about the decision and its historical context.
Award for International Achievement

of Illinois' international university.

Walsh designed Greenlight Planet's first solar lantern as an undergraduate student after spending a summer in Mexico, Caucasus Region, Central Asia Region, China and water resources engineering and the director of the Ar- chives, a teaching practice that also is a highly sophisticated art that recognizes the meritorious contributions, research and commitment of the university's young international students. Walsh designed Greenlight Planet's first
cultural and biological engineering at Illinois, received the Illinois International Undergraduate Achievement Award.

For more information about the awards and past recipients, visit http://international.illinois.edu/grants/awards.

Uncorked and On Topic
Humor to be discussed March 19

Uncorked and On Topic is a series new, featuring faculty members of different disciplines engaging in an intellec- tual exchange about the arts. The event is free and open to the public.

The 1,000 festival passes, cover- ing all screenings during the five-day festival, will be sold. There are a total of four per person. "A Nation in Tears: 150 Years after Lincoln's Death"

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Ebertfest tickets go on sale April 1, guests announced

Ebertfest guest: Actor Chazz Palminteri, at right opposite

Robert Diniro in this poster for "A Bronx Tale," will be a guest when the movie is screened at this year's Ebertfest.

Sponsors and volunteers for the festival are still being sought. Those interested should contact Mary Susan Smith, the festival's co-founder, at 217-244-0552, or by email at mar sue.illinois.edu.

ON THE WEB

ebertfest.com
thevirginia.org

"A Nation in Tears: 150 Years after Lincoln's Death"

The sesquicentennial of Abraham Lincoln's assassina- tion is being observed this week for this year's Roger Ebert's Film Festival: Jean-Luc Godard's 1961 film "Goodbye to Language 3D," which will open the festival, and "A Bronx Tale," from 1993, directed by Robert De Niro.

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and his wife, Margaret. At the time of his death, Eric was working with sculptor Rob Fisher, then a professor at the university.

“The Illinois Union Info is excited to partner with 40 North for ‘The Eric Show’ again this year,” said Jared Ekins, IUB program advisor. “This is a tremendous opportunity to connect local students with the Illinois Union Art Gallery and show off their work. We enjoy engaging the local community and cementing these relationships.”

The exhibit will display student work from the following high schools: Arcola, Bement, Centennial, Central, Gibson City-Melvin-Sibley, Heritage, Monticello, Paxton-Bunyon's, Rantoul, Champaign, Urbana, Villa Grove and Westville.

The Illinois Union Art Gallery is located in the northwest wing of the Illini Union and is open Sunday through Thursday from 7 a.m. to midnight and Friday and Saturday from 8 a.m. to 1 a.m.

#inclusiveillinois

Workshops offer diversity conversation

Inclusive Illinois, in partnership with the chancellor, offers a speaking tour through a series of campus conversations around the question “How do we build an inclusive Illinois?”

In addition to campus lectures, there will be opportunities for open discussion, to connect about issues of diversity, inclusion and school spirit at Illinois.

Three campuswide conversations will take place:

- March 30: graduate and professional students, Alice Campbell Alumni Center, 11:30 a.m.-2 p.m. (open to all graduate and professional students). RSVP is required by March 24.
- March 31: undergraduate students, Student Dining and Residential Programs multipurpose rooms, 7:30 p.m. (open to all undergraduate students).
- April 1: faculty and staff members, 8 -11 a.m., i Hotel and Conference Center. RSVP is required by March 25.

For more information about how to join the conversations, email inclusiveillinois@illinois.edu or visit Inclusivillinois.illinois.edu.

Facilities and Services

Bike plan incorporated into master plan

The Campus Bike Plan was approved March 3 by the Chancellor’s Capital Review Committee and is now an officially recognized part of the I of I Campus Master Plan. Finalizing the bike plan is a major milestone for the bicycling community, and it shows our commitment to sustainability and active transportation,” said Morgan Johnston, associate director of Facilities and Services.

The bike plan was updated in 2014 following a public comment period. It outlines bicycle-related infrastructure plans, using complete streets, as well as education and enforcement, to improve the convenience, user-friendliness and ridership of the bike network within the University District.

The campus is certified as a bronze-level bicycle-friendly university (http://bikeleague.org/university) by the League of American Bicyclists. The development of a comprehensive bike plan is a key component for renewal of that designation, which will occur this fall.

Several high-priority projects highlighted in the bike plan already are in development, including work funded by the Illinois Department of Transportation, the Transportation Investment Generating Economic Recovery Multi-modal Corridor Enhancement project and the Student Sustainability Committee.

View the Bike Plan online at http://fs.illinois.edu/Bike-Plan.

Beckman Institute

Final two Director’s Seminars scheduled

The final two Beckman Institute Director’s Seminars of the semester are scheduled. Susan Schantz, a professor of comparative biosciences, will present a talk April 2 titled “Neurotoxology Comes to Beckman.”

April 30 will feature two Beckman Postdoctoral Fellows, Suija Bhat with “Quantifying Second Language Proficiency,” and Heath Lucas with “The Monitoring and Strategic Control of Memory Representations in Younger and Older Adults.”

All lectures are located in Beckman Room 1005, and lunch will be provided.

A report on honors, awards, appointments and other outstanding achievements of faculty and staff members

The university needs a long-term solution to provide a more efficient civil service hiring and classification system, said Walter Knorr, the university vice president and chief financial officer.

“We must have the ability to define our workforce based on the ever-changing needs of the University of Illinois,” he said. “Every university in the state is in the same situation.”

Providing a larger applicant pool for civil service positions would support the university’s commitment to diversity, said Tyrone Forman, UIUC associate chancellor and vice provost for diversity.

“It mirrors our goals of being a more accessible and inclusive university and reflecting the demographics of the Chicago metropolitan area,” said Forman, a professor of African American studies.

March 19, 2015

InsideIllinois

InsideIllinois
Cultivated papaya owes a lot to the ancient Maya

A genetic study of papaya sex chromosomes reveals that the hermaphrodite version of the plant, which is of most use to growers, arose as a result of human selection, most likely by the ancient Maya some 4,000 years ago.

The study, reported in the journal Genome Research, homes in on a region of papaya’s male sex chromosome that, the study indicates, gave rise to the hermaphrodite plants.

“This research will one day lead to the development of a papaya that produces only hermaphrodite offspring, an advance that will enhance papaya root and canopy development while radically cutting papaya growers’ production costs and their use of fertilizers and water,” said U. of I. plant biology professor Ray Ming, who led the research. Ming is a professor in the Carl R. Woese Institute for Genomic Biology at Illinois.

Papaya plants are either male, female or hermaphrodite. The hermaphrodites produce the desirable fruit that is sold commercially. Growing hermaphrodites is costly and inefficient, however, because one-third of hermaphrodite fruit seeds and one-half of female fruit seeds generate female plants, which are useless to growers. Farmers cannot tell which seeds are hermaphrodites until the plant has flowered, so they plant multiple seeds together to maximize their chances of getting at least one hermaphrodite plant. Once they identify the desired plant, they cut the others down.

The Y chromosome in papaya hermaphrodites, which is called Yh, arises from an altered form of the male Y chromosome. Researchers are keen to understand the genetic basis for this alteration, so they can develop “true-breeding” hermaphrodite papaya, which will produce only hermaphrodite offspring, Ming said.

“Identification of an ancestral male population that the modified hermaphrodite Yh evolved from will allow us to track down the mutation that caused the male-to-hermaphrodite sex reversal,” he said.

The researchers sequenced and compared the “male-specific” and “hermaphrodite-specific” regions of the Y and Yh sex chromosomes, respectively, in 24 wild male papaya and 12 cultivated hermaphrodite plants. They found a less than half of 1 percent difference between the male and hermaphrodite sequences, suggesting that the evolutionary event that caused them to diverge occurred in the not-too-distant past.

“The sex chromosomes in other organisms, such as mammals, are ancient and the genes involved in their initial evolution cannot be identified because many subsequent changes, including gene gains and losses, have occurred,” the authors wrote. Human sex chromosomes, for example, are an estimated 167 million years old, while papaya sex chromosomes date to about 7 million years ago. This makes the papaya a good model for understanding sex chromosome evolution in general, Ming said.

Among the male papaya plants, the team identified three distinct wild populations: MSY1, MSY2 and MSY3. Their analysis revealed that the MSY3 population was most closely related to the hermaphrodite sex chromosome. All of the MSY3 plants in the study were from the northwest Pacific coast of Costa Rica.

“Our analyses date the divergence (of male and hermaphrodite papaya) to around 4,000 years (ago), well after the domestication of crop plants in Mesoamerica more than 6,200 years ago, and coinciding with the rise of Maya civilization about 4,000 years ago,” the authors wrote.

Given that no wild hermaphrodite papayas have been found in Central America, “this strongly suggests that the (hermaphrodite papaya) resulted from papaya domestication by the Maya or other indigenous groups,” the researchers wrote.

The National Science Foundation supported this research.