



‘Rice & Language’ Symposium Explores Ancient Past from Interdisciplinary Perspectives



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The importance of rice cultivation to the societies of Southeast Asia is self-evident. Virtually all Southeast Asian agricultures are rice-based, and rice agriculture has spread even into high and inhospitable terrains, through the innovation of adaptive varieties and hillside irrigation techniques. And yet the origin of rice domestication—and the routes by which rice farming practices entered into Southeast Asia are still little understood. Modern domesticated Asian rice (*Oryza sativa* L.) is represented by five, well-differentiated subpopulations that all descend from a common wild ancestor (*Oryza rufipogon*), which occurs throughout tropical Asia. Scholars have generally agreed upon at least one site of domestication in the Yangzi River valley, but whether this

was the sole point of domestication for all varieties of *Oryza sativa*, and how domesticated varieties—and the technologies and practices that made them possible—spread across the continent remains one of the greatest mysteries of human prehistory.

Last September, geneticists, anthropologists, archaeologists and linguists from around the world gathered at Cornell University, in collaborative investigation of the origins and spread of rice agriculture. The three-day symposium, called “Rice & Language Across Asia: Crops, Movement & Social Change,” brought together cutting-edge research, methodologies, and experience from across the sciences and humanities in a groundbreaking example of interdisciplinary cross-fertilization. Catalyzed by

Top: Manjil Hazarika (Leiden University) explaining his poster to John Whitman (Cornell Linguistics, organizer), while Laurent Sagart (CRLAO-CNRS, organizer) examines another poster in the background

Middle: Participants gather for a group photo at the conclusion of the symposium

recent advances in both the sciences and humanities, “Rice & Language Across Asia” examined the hypothesis (spearheaded by symposium speaker, Peter Bellwood of Australian National University) that language spread in tandem with farming technology. Invited experts shared new evidence on the origin and spread of rice domestication from a multitude of disciplinary perspectives, ranging from agronomy, genetics and climatology, to linguistics, archaeobotany and cultural anthropology.

During the course of the symposium, experts tangled with the capacity for each discipline to contribute to a richer understanding of rice domestication in ancient Asia. Geneticists, including organizer Susan McCouch (Cornell University) and Ishii Takashige (Kobe University, Japan) presented new findings on the evolutionary history of domesticated rice varieties, partially based on newly

isolated domestication genes. This work on the genetic history of domesticated rice was coupled with linguistic research on the genealogies of rice and agricultural vocabulary across the five major language superfamilies of Asia. Linguists including David Bradley (La Trobe University, Australia) and organizer Laurent Sagart (CRLAO-CNRS, France) sought to establish the evolutionary history of these rice and grain-related vocabularies in much the same way geneticists were seeking to establish the evolutionary history of domesticated rice. Experts in both fields were struck by the many similarities between genetic and linguistic investigation, and grappled with subtle but defining differences in the ways language versus biological systems evolve. While both disciplines employ shared models of branching evolution, the ready capacity for language to evolve through contact with other languages introduces serious

differences in the application of those models. The nature of what each record (linguistic or genetic) reveals about human prehistory also became a focal point of the interdisciplinary conversation.

Linguistic and genetic findings were complemented by strong archaeobotanical work on early grain cultivation practices in ancient Asia. In particular, novel fieldwork on poorly described areas in Thailand and southwestern China provided new material evidence for the geographical scope of rice cultivation across the continent. These investigations of the genetic, linguistic, and material records were furthermore contextualized by anthropologists such as Peter Bellwood (mentioned above), who sought to uncover the cultural conditions under which exchanges of technological and linguistic material were transacted.

The symposium is noteworthy for having successfully established a new



Annie Sheng Graduate student in anthropology

As a first year graduate student, I had never been to the Cornell Plantations before and when the opportunity arose after the Rice and Language Symposium, I was reeling with all these thoughts on rice movement and domestication that I could not clear my head to make a proper decision. I was tempted to join the tour, but thought perhaps I should do what I understood to be my graduate student duty and return home to do some reading instead. Perhaps if the weather was just slightly more gray, just a tad darker than the brilliant sunniness that graced the day, I may not have gone to Taiwan and participated in the International Symposium of Rice Functional Genomics (ISRFG) at Academia Sinica. At the time it seemed a waste to sit indoors on such a fine day when I could be exchanging ideas with brilliant minds while learning more about the gems of Cornell’s expansive campus.

It turned out to be a great decision, and it makes me wonder about how things come about in life, when the choice to join the walk was almost a whim then: it could have gone one way or the other. During the walk, I joined in on a conversation with the presenters from Academia Sinica in Taiwan and some biologists and geneticists from the RiceLab. One of the people I spoke with was Dr. Caroline Hsing, the head coordinator of the upcoming ISRFG. We chatted about rice, their lab in Academia Sinica, my research interests and aspirations, as well as her former time at Cornell, among other topics.

While we walked around Beebe Lake, I learned about the travel grant from the USDA National Institute of Food and Agriculture (USDA-NIFA) to present. I had my doubts; as an anthropologist, I thought it might be a bit of a stretch to participate in a symposium focusing on functional genomics, but if the Rice and Language class and symposium taught me one thing (among others of course), it was that the merits of interdisciplinary research cannot be so easily dismissed. I had been churning thoughts about rice domestication all day. I had even commented during the symposium that I felt that the utilitarian notions (on rice as simply nutritional or foodstuff, without reflection) on which some (but not all) presenters had advertently or inadvertently based their models of rice spread were misguided in not paying enough attention to the cultural mediation humans place on the world around us. Instead, I suggest we look at the salient feature of the white pericarp (in

Annie Sheng
in front of
her poster at
the ISRFG in
Taiwan

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discursive space, limited neither by discipline nor field, and defined not by methodology but by the nature and dimensions of the issue under investigation. The origins and spread of rice domestication across Asia represent an inter-disciplinary mystery that requires the collaboration of multiple perspectives and expertise to unravel. The bridging of such vastly different

fields, methodologies, and theoretical frameworks is no small task. While a great deal about the history and spread of rice domestication remains unresolved, the enthusiastic partnership of such a broad array of experts remains one of the symposium's greatest achievements. The collaborative mindset, cross-disciplinary education, and mutual learning that

characterized last September's meeting have set the stage—not only for major advances in our understanding of Rice & Language across Asia—but for truly substantive and impactful work across the disciplines on any topic. ☺

Left: Toshiki Osada from the Research Institute for Humanities and Nature, Kyoto, Japan presenting
Middle: Pittayawat Pittayaporn (Cornell Ph.D. '09) from Chulalongkorn University, Bangkok, Thailand discussing his poster presentation on Tai languages
Right: Touring the Cornell Plantations after the closing panel of the symposium: Dr. Charles Chen (RiceLab), Annie Sheng, Yuan-ching Tsai (Academia Sinica), Caroline Yue-le Hsing (Academia Sinica), Chih-Wei Tung (RiceLab), and Magnus Fiskesjö (Cornell Anthropology, organizer)



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the widespread 14 base pair deletion in the Rc gene) in domesticated rice framed as a question. Why and how did white rice become the marker for domestication? How did humans, as agents that shape and are shaped by culture, participate and intervene in the process? Even at Beebe Lake, I was already formulating an inchoate version of my poster presentation and final paper topic.

Through the encouragement of the scientists both at Academia Sinica and the RiceLab, who were adamant about the value of interdisciplinary cooperation, I decided to apply for the USDA-NIFA grant to the ISRFG and was grateful and happy to hear of the positive results.

The ISRFG in Taiwan was a great experience. Perhaps this speaks on the limitations of my own imagination, but I was impressed by the amount and variety of participants present—it was invigorating to be in the midst of so many scientists committed to furthering rice genetics in Asia. Although some of the jargon went over my head, the class had prepared me well to understand the gist of the presentations. One of the most interesting points is how complicated functional genomics is and the contention in interpreting data. The field of functional genomics puts out an immense amount of data; yet, gene functions and interactions are not as straightforward and clear

as easy algebra problems. Some presentations asked more questions than answered, and pointed to more issues for consideration rather than offering solutions. Yet, I contend that the recognition of problems that have yet to be tackled has its value.

I believe I was the only anthropologist, and likely social scientist, in the hall; although the International Rice Research Institute employs anthropologists, none seemed to be present. In light of this, I found that participants received my poster in different ways: some showed mild interest at the anthropological lens in which I approached rice domestication, which included using color and value theory as approaches to understanding human interaction with rice. Others were quite interested, asked questions and wondered about the role of color in rice spread. I talked to a plant breeder from Korea who had come by my poster and circled around again to return and converse with me at length about red rice, the importance of color and anthropological aspects in plant breeding, and ritual use of rice in Korea and other parts of Asia. I found that these posters facilitated more intimate and in depth conversation about rice use in Asia and its relevance when considering rice functional genomics.

Perhaps the best times for learning more about rice functional genomics and the

International Rice Research Institute in an informal manner were the long conversations during lunch. People let loose and I found myself enjoying the tales of researchers planting each grain of rice by each grain of rice in the fields, or the descriptions of the hyperbolically technological new devices for crop fertilizing and chemical application, such as fertilizers equipped with Global Positioning Systems.

As a whole, the class and symposium at Cornell has been a very rewarding experience. Not only did I learn much on campus, it also paved the way for discussions off-campus. It set the stage for the singular trip to Academia Sinica to exchange ideas about rice and learn about the diversity of ideas and angles to approach rice functional genomics. ☺

A selection of articles from the symposium, edited by Caroline Yue-le Hsing and Magnus Fiskesjö, will soon be published in the journal *Rice* vol. 4 no. 4 (ISSN 1939-8425). Some articles are appearing online first: <http://www.springer.com/life+sciences/plant+sciences/journal/12284>

Symposium program and abstracts available at: <http://conf.ling.cornell.edu/riceandlanguage/>



Kaja McGowan shows students objects associated with the Balinese rice goddess Dewi Sri



Rice Across the Disciplines: Perspectives on the new Rice and Language Class

In the spring of 2010 fifteen faculty and graduate students participated in an interdisciplinary one-credit reading course focused on the origins and spread of rice cultivation and domestication. Participants from Linguistics, Anthropology, Archaeology, Plant Breeding and Genetics, International Agriculture and Rural Development (IARD), and Applied Economics and Management (AEM) followed up on this initiative with an International Symposium at Cornell in September 2011 on “Rice and Language Across Asia.” The conference spanned three days and was packed with participants eager to present their findings to fellow researchers. In between panels, participants clustered around the poster sessions and discussions continued over meals.

Faculty, graduate students and researchers were not the only people in attendance—one might have been surprised to find a number of Cornell undergraduates among the

attendees. These undergraduates were all students from the new multi-disciplinary course, Rice and Language: Geography, Movement, and Exchange (ANTHR/ARKEO/IARD/LING 4495 and 7495). As one student said, “The symposium was a really interesting experience for me, not only to hear scholars speak whose works we would be reading throughout the semester, but also to see how these individuals were actively ‘creating knowledge,’ as one classmate put it, by discussing the issues right there in front of us. It was also an interesting experiment in interdisciplinary research.” (Mallory Matsumoto)

Led by anthropology professor Magnus Fiskesjö, the class was designed to connect with the symposium and the students had the opportunity to have a number of the symposium presenters as visiting instructors in the class over the course of the semester. Graduate student Perri Gerard-Little commented, “The symposium was a good way to get

a wider sampling of issues, as well as understand how all of the issues we were covering separately actually interact with each other. If there was no symposium I think the class would need to be significantly reorganized in order to provide the same kind of synthetic understanding. Another student, linguistics major Annie Bass noted, “I enjoyed learning from the different lecturers each week in the class. Combined with the conference it felt like a special opportunity to be in the middle of a developing field of research, but I definitely think a similar curriculum would work without a conference.”

Professor Fiskesjö described his position as not only the instructor for the course, but also as a “coordinator” of sorts for his students. Like the symposium, the course was highly interdisciplinary. Guest lecturers included

symposium organizers such as linguist Laurent Sagart, senior scientist at the Centre de Recherches Linguistiques sur l’Asie Orientale (at CRNS), who came from Paris, as well as John Whitman (linguistics) and John Phan (a Ph.D. candidate in Asian Literature). Several students reported that linguistics was one of the eye-opening topics in the course for them. According to Shelina Gautama, a Biological and Plant Sciences major, “One of the things we learnt in class was historical linguistics, a discipline that I didn’t even know existed before. It’s really interesting to see how languages are related to each other and how they change through time.” Perri Gerard-Little had a similar experience, “It was a helpful exposure to linguistics, which was the aspect of the course that I was personally the least familiar with at the start. From an archaeological perspective it covered a lot of ground that I was already familiar with, at least theoretically.”

For other students, the lectures by Susan McCouch, Plant Breeding and Genetics and later Charles Aquadro, Molecular Biology and Genetics, were the highlights of the interdisciplinary experience. Martha Austen, a linguistics major, said, “I really enjoyed learning about human/plant genetics—I think the fact that we can uncover ancient human (and plant) migrations through modern DNA is incredibly fascinating, and it’s really interested to see how

different populations are related and how they diverged. It’s also interesting how many similarities phylogenetics and historical linguistics share—historical linguistics seems to do the same thing, but with sounds and sound changes instead of genes and genetic mutations.”

Other guest lecturers covered archaeology—both human origins and the beginning of agriculture (Eric Cheyfitz, American Studies; Tom Volman, Anthropology; and Nerissa Russell, Anthropology), agro-history and socio-economic change (Randy Barker), and rice in art and culture (Kaja McGowan). Throughout the course Magnus Fiskesjö drew on his expertise on the history and cultures of the region, especially the intersections between ethnicity and patterns of agriculture. However Fiskesjö’s role went much deeper as he helped introduce the widely varied fields to

his students (including the different jargon associated with each discipline) and help them synthesize and make sense of the connections between each week’s topic.

In a recent interview with Professor Fiskesjö, he mentioned that the course revolved around several main questions: Why is rice so important? When did people first begin to cultivate wild rice, and how did it change the people and cultures involved? Why

and how do people rely on rice? With so many different approaches to discovering the answers to these questions, collaboration and a willingness to cross disciplinary boundaries are essential and that is what he hopes to convey to his students. Fiskesjö himself has experience crossing disciplinary boundaries. Originally from Sweden, he worked for many years as a translator and cultural attaché for the Swedish Foreign Service in Asia before he obtained his PhD in Anthropology and Asian studies at the University of Chicago. He then moved on to become the director the Museum of Far Eastern Antiquities in Stockholm. Years later, he shifted back to academia and took a position in the anthropology department at Cornell. His research focuses on ethnic minorities in China, Burma, and Thailand, as well as tracing how spoken stories tell a deep history about a culture’s people. As he put it “narrating the past is one way of building an identity in the present. The stories of the



Randy Barker showing a rice sample to students

past are an important building block of [not only a] present identity, but into the future as well." In a sense, telling stories is a collaborative act of culture creation.

At the symposium students witnessed scholars actively creating knowledge and as they progressed through the course, they each found ways to participate in the process of knowledge creation. The final papers that the students wrote were as varied as the guest lecturers; each student had the chance to articulate his or her own synthesis and perspective on the emerging interdisciplinary conversations. Here is a sampling of student paper topics:

Shelina Gautama: *For my final paper I'm trying to piece together the origin of sticky rice from research in genetics and anthropology. Research on the gene responsible for the sticky characteristic suggests that sticky rice varieties arose in japonica in mainland Southeast Asia and were introgressed into other varieties. Anthropological research helps to answer the question why sticky rice varieties were selected for. They were probably initially selected for by the Tai people who migrated from China and were settling in the uplands of mainland Southeast Asia because sticky rice varieties are well suited to the local environment. Cultivation of sticky rice then spreads as cultural preference for sticky rice developed and the Tai people become politically dominant.*

Annie Bass: *My final paper explores possible explanations for the overlap in terminology for rice agriculture and human sexuality in Balinese. Though the topic/exposition is linguistically based, the possible explanations and evidences are more anthropological, art-history oriented, and religious-studies-ish in nature.*

Martha Austen: *I actually ended up writing about early alcoholic beverages in East Asia -- one of our guest speakers mentioned something about the world's first alcoholic beverage, which was found in China, and I was captivated. This early beverage was roughly contemporaneous with the domestication of rice, so I explored how the cultivation and domestication of rice might have been related to a desire to make fermented beverages for feasting and/or religious purposes. (The answer, for now, is inconclusive.)*

Mallory Matsumoto: *Largely inspired by a photograph of a pot sherd embedded with an ancient rice grain that was presented at the symposium, I chose to write my final paper about ancient ceramics containing rice husk temper. (Temper is usually incorporated into the clay by the potter to give the finished product*

certain qualities--in the case of organic materials like rice husk, for example, the temper makes the finished product more porous and thus better able to resist thermal shock, which would be an especially helpful characteristic for cooking pots.)

Perri Gerard-Little: *My paper was about the way the spread of maize agriculture to the Northeastern United States has been researched and how it diverges significantly from research on the diffusion/spread of rice agriculture. I wrote the paper because it relates to my own dissertation research in the Northeast.*

When asked about his own opinion of the Rice and Language symposium, and by extension the new course, Fiskesjö said that he "felt that there was a new level in this whole big picture. We were able to stand back and look at the whole picture." Fiskesjö emphasized how seeing this "big picture" really showed him personally that this is a worthwhile project, and that it is worth continuing to pursue answers to these questions even though "there's a lot of grey areas that we may never know." He indicated that collaborative symposiums such as these "help us [as researchers] to put things together to reach a new level of understanding [...] it's quite exhilarating. All of [us] have pieces of a puzzle that all fit together, and the challenge now is how to put these different pieces together."

His thoughts were echoed by students. Mallory Matsumoto put it most succinctly, "I ... gained from the course insight into both the value and difficulty of reaching across disciplines in one's own research, as well as the infrequency with which this is done." But her classmate Martha Austen had a different and refreshing perspective, "I think people make a really big deal out of interdisciplinary classes/programs and seem to assume that most people are stuck firmly in their majors and uninterested in anything else (and that there is some huge cultural divide between the humanities and the sciences), but I don't think that's actually true. Most people, especially at a place like Cornell, have a variety of interests and enjoy learning about all sorts of different things. I don't think that interdisciplinary classes are particularly groundbreaking or are a way to bridge the (in my view) non-existent gap between different disciplines. They are, however, a lot of fun, and there should be more of them! Hopefully the Southeast Asia Program can continue to foster and support such fun and intellectually stimulating interdisciplinary courses. ♪

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