

September 21, 2015

Members of the Search Committee
Department of Anthropology
San Diego State University
San Diego, CA 92182-6040

Dear members of the search committee:

Thank you for considering my application to the assistant professorship in the archaeology of human-environmental dynamics at the San Diego State University. I am an archaeologist who specializes in computational approaches to studying human-environment interactions, with a particular focus on the prehistory of the southwestern United States. I completed my PhD at Washington State University in December 2014. I am currently a post-doctoral researcher at WSU as part of an interdisciplinary, NSF-sponsored project to make paleoenvironmental data more widely available to researchers and the public.

My principal research interests concern using computational analysis of landscapes and climate to help understand cultural transitions in prehistory. My dissertation was comprised of three research articles in which I employed new approaches to longstanding research questions in Pacific Northwest Coast and Southwest US prehistory. In the first article¹, I developed a raster-based "index of defensibility" and applied it across the Gulf of Georgia and lower Fraser River regions of British Columbia. I then assessed the defensibility of habitation sites over the last 5,000 years in light of the baseline defensibility of the landscape to infer defensive decision-making as it applied to settlement location. In the second article², I developed a new method for reconstructing high-resolution spatiotemporal climate fields from networks of regional tree-ring chronologies. My method automatically selects good chronologies for reconstructing a given climate signal for any time and place on the landscape, and generates reconstructions that are competitive with leading climate-field reconstruction techniques. I used this method to estimate the rain-fed maize growing niche in two large regions of the Southwest over the last 2,000 years, and examined the timing and trajectory of the 13th-century Ancestral Pueblo migrations between the regions. The third paper (currently under revision) expands this analysis and uses temperature and precipitation reconstructions in concert with a model of maize growth to generate potential maize productivity estimates across the landscapes. The methods I developed throughout the dissertation—and especially the paleoclimate reconstruction method—are currently being employed by several research teams in the Southwest and elsewhere³⁻⁶.

I have several ongoing research projects and collaborations. I am particularly interested in the coevolution of cultivar landraces and the culturally-bound selection and cultivation strategies from which they arise. I am currently modeling the potential productivity (yields) of several contemporary varieties of Pueblo corn across the Southwest US under modern and simulated past weather scenarios. The hope is to identify the environmental conditions under which each of these modern varieties will thrive—and, by extension, the conditions in which each may have evolved. I am also collaborating with researchers in southwestern China and eastern Africa to explore similar processes for traditional varieties of millet, wheat, and barley³⁻⁵. All of my crop modeling research will better-document the phenological diversity among modern traditional crop varieties—diversity that will likely be very useful for feeding future populations in light of projected climate change. This research has brought me into collaboration with agronomists, crop-modelers, and climate modelers.

My other ongoing research collaborations are very focused on large-scale environmental and GIS modeling.

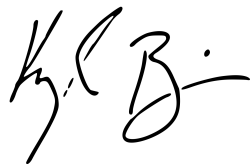
In my current role as a post-doctoral researcher in the SKOPE project—*Synthesized Knowledge of Past Environments*—I have focused on vastly expanding the geographic reach of my paleoclimate modeling efforts² to encompass the entire US Southwest, and have led an effort to compare these reconstructions with large databases of tree-ring dates and other archaeological data⁷. I am currently taking the lead on developing an NSF cyber-infrastructure implementation grant to further expand the geographic extent of SKOPE and shape it as a tool for model inter-comparison and reproducible research. In a separate project, colleagues and I have recently completed a large inter-visibility (viewshed) analysis among Chacoan Great House and shrine sites in the Southwest⁸. I am also the author and maintainer of several packages for the *R* statistical computing language^{9,10}. The highly interdisciplinary nature of my research would make me good fit in the Center for Climate and Sustainability Studies at SDSU. I have a proven capacity to engage productively in collaborative research within and beyond archaeology, and genuinely enjoy learning about other fields of study and sharing my methodological expertise. I would in particular enjoy involving undergraduate and graduate students in my research, including potential field and lab opportunities with my collaborators at other universities and at Crow Canyon Archaeological Center.

The model-based, geographic approach I have taken in my research has also been an important aspect of my pedagogical approach in the classroom. I designed *The Americas Before Columbus*—an upper-level undergraduate review course about North and South American prehistory—as a course on model-based social science. I presented students with archaeological data from the Americas and various interpretations (models) that might explain those data, and challenged my students to take a goodness-of-fit approach to choosing between different explanations. Currently, I'm co-teaching a graduate course in exploratory data analysis in *R* where I am helping students develop testable hypotheses for complex data. I would be interested in developing either of these courses to fit the curriculum at SDSU. I'm also very interested in developing new courses in GIS and quantitative analysis at both the graduate and undergraduate level.

SDSU also offers many opportunities for expanding my research collaborations. Having a background in human behavioral ecology, I am very interested in learning more about Erin Riley, Todd Braje, and Matthew Lauer's research. Dr. Lauer's work on indigenous ecological knowledge systems and long-term environmental change aligns particularly well with my current research interests in long-term adaptation of traditional agricultural systems. I would look forward to collaborating with him and other SDSU researchers, especially on integrating high-resolution paleoenvironmental modeling with understandings of socio-environmental adaptation.

Again, thank you for considering my application. Please do not hesitate to contact me if I can be of any assistance. I look forward to hearing from you.

Sincerely,

A handwritten signature in black ink, appearing to read 'R. Kyle Bocinsky' in a stylized, cursive script.

R. Kyle Bocinsky, PhD

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1. Bocinsky, R. K. Extrinsic site defensibility and landscape-based archaeological inference: An example from the Northwest Coast. *Journal of Anthropological Archaeology* **35**, 164–176 (2014).
2. Bocinsky, R. K. & Kohler, T. A. A 2,000-year reconstruction of the rain-fed maize agricultural niche in the US Southwest. *Nature Communications* **5**, 5618 (2014). Doi: 10.1038/ncomms6618.
3. d'Alpoim Guedes, J., Bocinsky, R. K. & Butler, E. E. Comment on "Agriculture facilitated permanent human occupation of the Tibetan Plateau after 3600 bp". *Science* **348**, 872–872 (2015).
4. d'Alpoim Guedes, J., Jin, G. & Bocinsky, R. K. The impact of climate on the spread of rice to north-eastern China: A new look at the data from Shandong Province. *PLoS One* (2015).
5. d'Alpoim Guedes, J., Manning, S. & Bocinsky, R. K. A 5500 year model of changing crop niches on the Tibetan Plateau. *Current Anthropology* (In review).
6. Schwindt, D. M. *et al.* The social consequences of climate change in the Central Mesa Verde region. *American Antiquity* (In press).
7. Bocinsky, R. K., Rush, J., Kintigh, K. W. & Kohler, T. A. Macrohistory of the Prehispanic Pueblo Southwest: Cycles of Exploration and Exploitation. *Science* (In review).
8. Van Dyke, R. M., Bocinsky, R. K., Robinson, T. & Windes, T. C. Great houses, shrines, and high places: Intervisibility in the Chacoan World. *American Antiquity* (In review).
9. Bocinsky, R. K. *FedData: Functions to Automate Downloading Geospatial Data Available from Several Federated Data Sources* (2015). URL <http://CRAN.R-project.org/package=FedData>. R package version 2.0.
10. Bocinsky, R. K. *PaleoCAR: Paleoclimate Reconstruction from Tree Rings using Correlation Adjusted correlation* (2015). URL <https://github.com/bocinsky/PaleoCAR/archive/2.0.tar.gz>. R package version 2.0.