

March 10, 2016

Smithsonian Institution  
Office of Human Resources  
600 Maryland Ave., SW, Suite 5060  
Washington, DC 20024

Dear members of the search committee:

I am applying for the Research Archaeologist position at the National Museum of Natural History, as advertised on USAJOBS (announcement number 16A-JW-301080-DEU-NMNH). I am an archaeologist who specializes in computational approaches to studying human-environment interactions, with a particular focus on the Neolithic in the American Southwest. I completed my PhD at Washington State University in 2014 under Tim Kohler, and was 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. I am currently a researcher and sponsored projects director at Crow Canyon Archaeological Center in Cortez, Colorado.

My principal research interests concern using computational analyses of landscapes and climate to help understand cultural transitions in prehistory. My dissertation was comprised of three research articles in which I developed new approaches to longstanding research questions in the Pacific Northwest Coast and American Southwest. In the first article,<sup>1</sup> 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 article,<sup>2</sup> 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 other leading climate 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 13<sup>th</sup> century Ancestral Pueblo migrations between the regions. The third paper expands this analysis and uses temperature and precipitation reconstructions in concert with a model of maize growth to generate potential maize yield estimates across the landscapes—I am currently using these methods to explore the potential yields of over 150 contemporary indigenous maize varieties from across the Southwest. The techniques I developed throughout the dissertation—and especially the paleoclimate reconstruction method—have been employed by several research teams in the Southwest and elsewhere.<sup>3–7</sup>

I have several ongoing research collaborations. I am particularly interested in the coevolution of cultivar landscapes and the cultivation and selection contexts from which they arise (both natural and cultural)—including processes of niche adaptation and construction. As mentioned above, I am modeling the potential yields of several contemporary varieties of Pueblo corn across the Southwest US under modern and simulated past weather scenarios. I hope 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 barley.<sup>4–6</sup> 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, agricultural modelers, maize geneticists, and climate modelers, as well as contempo-

rary Pueblo farmers. (I'll actually be presenting aspects of this work at a Smithsonian Associates weekend program on May 21.) In related research, I am part of a team helping to define the complex history of the domestication of turkey in the Southwest, which was closely tied—both practically and ritually—to maize agriculture.<sup>8,9</sup>

My other ongoing research collaborations focus on large-scale environmental and GIS modeling. During 2015, I was a post-doctoral researcher in the SKOPE project—*Synthesizing Knowledge of Past Environments*—where I vastly expanding the geographic reach of my paleoclimate reconstructions<sup>2</sup> to encompass the entire US Southwest, and also led an effort to compare these reconstructions with a large database of tree-ring dates from the region.<sup>3</sup> I have recently collaborated in developing an NSF cyber-infrastructure implementation grant to further expand the geographic extent of SKOPE and shape it into a tool for model inter-comparison and reproducible research (I'm a Co-PI on that proposal, which is under review with the NSF). 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 Southwest.<sup>10</sup> I am also the author and maintainer of several packages for the *R* statistical computing language that are designed to make research on human-environment interactions more reproducible.<sup>11,12</sup> The highly interdisciplinary nature of my research would make me good fit in the Smithsonian; 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 (and seeking funding for) museum interns in my research, including potential field and lab opportunities with my collaborators at universities and Crow Canyon Archaeological Center.

The NMNH also offers many opportunities for expanding my research collaborations, especially within the museum. My research on the co-domestication of maize and turkey in the American Southwest aligns most strongly with Drs. Zeder, Smith, and Piperno, and I would enjoy collaborating with Dr. Rogers' on ecologically-engaged agent-based modeling. I would also seek to continue my most productive current research collaborations: with Tim Kohler and Jade d'Alpoim Guedes at Washington State University (focusing on the Neolithic in the American Southwest and Tibetan Plateau), and with my colleagues at Crow Canyon (documenting and modeling selection processes leading to contemporary maize diversity in the Southwest).

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. Bocinsky'.

R. Kyle Bocinsky, PhD

Adjunct Research Faculty  
Department of Anthropology  
Washington State University  
Pullman, WA 99164-4910

**phone** 770.362.6659

**email** bocinsky@wsu.edu

—and—

Director of Sponsored Projects  
Crow Canyon Archaeological Center  
Cortez, CO 81321

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. Bocinsky, R. K., Rush, J., Kintigh, K. W. & Kohler, T. A. Exploration and exploitation in the macrohistory of the prehispanic Pueblo Southwest. *Science Advances* **2**, e1501532 (2016).
4. 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).
5. 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).
6. d'Alpoim Guedes, J., Manning, S. & Bocinsky, R. K. A 5,500 year model of changing crop niches on the Tibetan Plateau. *Current Anthropology* (In press).
7. Schwindt, D. M., Bocinsky, R. K., Ortman, S. G., Glowacki, D. M., Varien, M. D. & Kohler, T. A. The social consequences of climate change in the Central Mesa Verde region. *American Antiquity* **81**, 74–96 (2016).
8. Bocinsky, R. K. & Kohler, T. A. Complexity, rigidity, and resilience in the ancient Puebloan Southwest. In Foster, H. T. I., Paciulli, L. & Goldstein, D. (eds.) *Viewing the Future in the Past: Historical Ecology Applications to Environmental Issues* (University of South Carolina Press, Columbia, South Carolina, 2015).
9. Lipe, W. D., Bocinsky, R. K., Chisholm, B. S., Lyle, R., Dove, D. M., Matson, R., Jarvis, E., Judd, K. & Kemp, B. M. Cultural and genetic contexts for early turkey domestication in the northern Southwest. *American Antiquity* **81**, 97–113 (2016).
10. 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 press).
11. Bocinsky, R. K. *FedData: Functions to Automate Downloading Geospatial Data Available from Several Federated Data Sources* (2016). URL <http://CRAN.R-project.org/package=FedData>. R package version 2.0.7.
12. Bocinsky, R. K. *PaleoCAR: Paleoclimate Reconstruction from Tree Rings using Correlation Adjusted correlation* (2016). URL <https://github.com/bocinsky/PaleoCAR/archive/2.1.tar.gz>. R package version 2.1.