Curriculum Vitae
Dolores R. Piperno

Address

Department of Anthropology, MRC 112, National Museum of Natural History, PO Box 37102, Washington, DC 20013-7012

Telephone: Work (301) 238-1025 (Lab) and (202) 633-1912 (Office); Evening (703) 865-4817
Email: pipernod@si.edu

Present Positions

Senior Scientist and Curator of South American Archaeology Emerita, Smithsonian National Museum of Natural History, Washington, DC, and Senior Scientist Emerita, Smithsonian Tropical Research Institute, Panama.

Education

1967-1971 Medical Technology, Rutgers University, B.S., 1971.
1976-1979 Anthropology, Temple University, M.A., 1979.
1979-1983 Anthropology, Temple University, Ph.D, 1983.

Dissertation

1983 The Application of Phytolith Analysis to the Reconstruction of Plant Subsistence and Environments in Prehistoric Panama (Anthony J. Ranere, dissertation committee chair).

Positions Held

2014- Senior Scientist and Curator of South American Archaeology Emerita, Smithsonian National Museum of Natural History (NMNH), Washington, DC
2008-Present, Adjunct Professor, Department of Biological Sciences, Florida Institute of Technology, Melbourne
2008-Senior Scientist Emerita, Smithsonian Tropical Research Institute, Balboa, Panama
2003-Present, Research Scientist and Curator of South American Archaeology, Department of Anthropology, National Museum of Natural History, Washington, DC
2005-Promoted to Senior Scientist at the NMNH and STRI
1988-2008 Staff Scientist, Smithsonian Tropical Research Institute (STRI), Balboa, Panama.
1985-1987 Postdoctoral fellow, National Science Foundation, Environmental Biology Program.
1983-1984 Postdoctoral fellow, Smithsonian Tropical Research Institute

Honors

2011 National Museum of Natural History Science Achievement Award
2009 Archaeological Institute of America Pomerance Career Award for Scientific Contributions to Archaeology
2009 National Museum of Natural History Science Achievement Award
2006 Orden de Vasco Nuñez de Balboa, The highest award given to a civilian by the Republic of Panama, for contributions toward understanding the prehistory of Panama
2005 Elected Member, National Academy of Sciences
2005 Elected Fellow, American Academy of Arts and Sciences
2001 Elected Fellow, American Association for the Advancement of Science

Publications: Books and Edited Volumes

1988 Piperno, Dolores R.; *Phytolith Analysis: An Archaeological and Geological Perspective*. Academic Press, San Diego. This was translated into Chinese and published in the People's Republic of China by the University of Peking Press, Beijing in 1993.

1993 Pearsall, Deborah M. and Dolores R. Piperno, editors; *Current Research in Phytolith Analysis: Applications in Archaeology and Paleoecology*. MASCA Research Papers in Science and Archaeology, Volume 10, The University Museum of Archaeology and Anthropology, University of Pennsylvania, Philadelphia.

1998 Piperno, Dolores R. and Deborah M. Pearsall; *The Origins of Agriculture in the Lowland Neotropics*. Academic Press, San Diego.

2006 Piperno, Dolores R. *Phytoliths: A Comprehensive Guide for Archaeologists and Paleoecologists*. AltaMira Press, Lanham, MD.

2014 Larson, G., and Piperno, D.R., Eds. The Modern View of Domestication. *Special Feature of the Proceedings of the National Academy of Sciences USA* , Volume 111.

Publications: Articles

1984 Piperno, D.R.; A Comparison and Differentiation of Phytoliths from Maize and Wild Grasses: Use of Morphological Criteria. *American Antiquity* 49:361-383.

1985 Piperno, D.R. and K. Husum Clary; Early Plant Use and Cultivation in the Santa Maria Basin, Panama: Data from Phytoliths and Pollen, in *Recent Developments in Isthmian Archaeology*, edited by F.W. Lange. British Archaeological Reports, International Series No. 212, pp. 85-121.

1985 Piperno, D.R.; Phytolithic Analysis of Geological Sediments from Panama. *Antiquity* LIX:13-19.

1985 Piperno, D.R.; Phytolith Taphonomy and Distributions in Archaeological Sediments from Panama. *Journal of Archaeological Science* 12:247-267.

1985 Piperno, D.R..; Phytolith Analysis and Tropical Paleo-Ecology: Production and Taxonomic Significance of Siliceous Forms in New World Plant Domesticates and Wild Species. *Review of Palaeobotany and Palynology* 45:185-228.

1985 Piperno, D.R., Clary, K.H., Cooke, R.G., Ranere, A.J., Weiland, D.; Preceramic Maize in Central Panama: Phytolith and Pollen Evidence. *American Anthropologist* 87:871-878.

1985 Piperno, D.R.; Phytolith Records from Prehistoric Agricultural Fields in the Calima Region, Colombia. *Pro Calima* 4:37-40. Publisher: Vereinigung Pro Calima, Basel, Switzerland.

1985 Cooke, R.G., Piperno, D.R., Ranere, A.J., Clary, K. H., Hansell, P., Olsen, S., Valerio, W., Weiland, D.; La Influencia de las Poblaciones Humanas Sobre Los Ambientes Terrestres de Panama Entre El 1000 A.C. and y El 500 D.C, in *Agonía de la Naturaleza*:*Ensayos Sobre el Costo Ambiental del Desarrollo Panameño*, edited by S. Heckadon Moreno and J. Espinosa Gonzalez. Smithsonian Tropical Research Institute and IDIAP, Panama, pp. 3-25.

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1987 Yentsch, A.E., Miller, N.F., Paca, B., Piperno, D.R.; Archaeologically Defining the Earlier Garden Landscapes at Morven: Preliminary Results. *Northeast Historical Archaeology* 16:1-29.

1988 Siemens, A.H., Hebda, R.J., Navarrete Nernández, M., Piperno, D.R., Stein, J.K., Zolá Báez, M.G.;

Evidence for a Cultivar and a Chronology from Patterned Wetlands in Central Veracruz, Mexico. *Science* 242:105-107.

1989 Piperno, D.R.; Non-Affluent Foragers: Resource Availability, Seasonal Shortages, and the Emergence of Agriculture in Panamanian Tropical Forests, in *Foraging and Farming: The Evolution of Plant Exploitation*, edited by D.R. Harris and G.C. Hillman. Unwin-Hyman, London, pp. 538-554.

1989 Piperno, D.R.; The Occurrence of Phytoliths in the Reproductive Structures of Selected Tropical Angiosperms and Their Significance in Tropical Paleoecology, Paleoethnobotany and Systematics. *Review of Palaeobotany and Palynology* 61:147-183.

1989 Bush, M.B., Piperno, D.R., Colinvaux, P.A.; A 6,000 Year History of Amazonian Maize Cultivation. *Nature* 340:303-305.

1990 Piperno, D.R., Bush, M.B., Colinvaux, P.A.; Paleoenvironments and Human Occupation in Late-Glacial Panama. *Quaternary Research* 33:108-116.

1990 Pearsall, D.M. and Piperno, D.R.; Antiquity of Maize Cultivation in Ecuador: Summary and Reevaluation of the Evidence. *American Antiquity* 55:324-337.

1990 Bush, M. B., Colinvaux, P.A., Wiemann, M.C., Piperno, D.R., Liu, K-b; Late Pleistocene Temperature Depression and Vegetation Change in Ecuadorian Amazonia. *Quaternary Research* 34:330-345.

1990 Piperno, D.R.; Aboriginal Agriculture and Land Usage in the Amazon Basin, Ecuador. *Journal of Archaeological Science* 17:665-677.

1990 Ciochon, R.L., Piperno, D.R., Thompson, R.G.; Opal Phytoliths Found on the Teeth of the Extinct Ape *Gigantopithecus blacki*: Implications for Paleodietary Studies. *Proceedings of the National Academy of Sciences USA* 87:8120-8124.

1990 Piperno, D. R.; Fitolitos, Arqueología y Cambios Prehistóricos de la Vegetación en un Lote de Cincuenta Hectáreas de la Isla de Barro Colorado, in *Ecología de un Bosque Tropical: Ciclos Estacionales y Cambios a Largo Plazo*, edited by E.G. Leigh, Jr., A. Stanley Rand and D.W. Windsor. Smithsonian Tropical Research Institute, Balboa, Panama, pp. 153-156.

1991 Piperno, D.R.; The Status of Phytolith Analysis in the American Tropics. *Journal of World Prehistory* 5:155-191.

1991 Piperno, D.R., Bush, M.B., Colinvaux, P.A.; Paleoecological Perspectives on Human Adaptation in Central Panama. I. The Pleistocene. *Geoarchaeology* 6:210-226.

1991 Piperno, D.R., Bush, M.B., Colinvaux, P.A.; Paleoecological Perspectives on Human Adaptation in Central Panama. II. The Holocene. *Geoarchaeology* 6:227-250.

1992 Piperno, D.R., Bush, M.B., Colinvaux, P.A.; Patterns of Articulation of Culture and the Plant World in Prehistoric Panama: 11,500 B.P. - 3000 B.P., in *Archaeology and Environment in Latin America*, edited by O.R. Ortiz-Troncoso and T. Van der Hammen. Instituut Voor Pre-En Protohistorisc

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1992 Bush, M.B., Piperno, D.R., Colinvaux, P.A., De Oliveira, P.E., Krissek, L.A., Miller, M.C., Rowe, W.E.; A 14,300-Yr Paleoecological Profile of a Lowland Tropical Lake in Panama. *Ecological Monographs* 62:251-275.

1993 Piperno, D.R., Pearsall, D.M.; Phytoliths in the Reproductive Structures of Maize and Teosinte: Implications for the Study of Maize Evolution. *Journal of Archaeological Science* 20:337-362.

1993 Piperno, D.R., Pearsall, D.M.; The Nature and Status of Phytolith Analysis, in *Current Research in Phytolith Analysis: Applications in Archaeology and Paleoecology*, edited by D.M. Pearsall and D.R. Piperno. MASCA Research Papers in Science and Archaeology, Volume 10, The University Museum ofArchaeology and Anthropology, University of Pennsylvania, Philadelphia, pp. 9-18.

1993 Piperno, D.R.; Phytolith and Charcoal Records from Deep Lake Cores in the American Tropics. In *Current Research in Phytolith Analysis: Applications in Archaeology and Paleoecology*, edited by D.M. Pearsall and D.R. Piperno. MASCA Research Papers in Science and Archaeology, Volume 10, The University Museum of Archaeology and Anthropology, University of Pennsylvania, Philadephia, pp. 58-71.

1994 Piperno, D.R.; Phytolith and Charcoal Evidence for Prehistoric Slash-and-Burn Agriculture in the Darien Rain Forest of Panama. *The Holocene* 4:321-325.

1994 Piperno, D.R.; On the Emergence of Agriculture in the New World: A Reply to Gayle J. Fritz. *Current Anthropology* 35:637-639.

1994 Jiang, Q., Piperno, D.R.; Phytolith Analysis of an Archaeological Site (Longshan Period) in Zhumadian City, Henan Province, China: Paleoenvironmental and Cultural Implications. *Geoarchaeology* 9:409-417.

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1996 Cooke, R.G., Norr, L., Piperno, D.R.; Native Americans and The Panamanian Landscape, in *Case Studies in Environmental Archaeology*, edited by E. J. Reitz, L.A. Newsom and S.J. Scudder. Plenum Press, New York and London, pp. 103-126.

1997 Piperno, D.R.; *Phytoliths and Microscopic Charcoal from Leg 155: A* Vegetational and Fire History of the Amazon Basin during the last 75 *K.Y.*, in *Proceedings of the Ocean Drilling Program*, *Scientific Results*, Vol. 155, edited by R. D. Flood, D. J.W. Piper, A. Klaus and L.C. Peterson. Texas A@M University, College Station, Texas, pp. 411-418.

1998 Piperno, D.R., Pearsall, D.M.; The Silica Bodies of Tropical American Grasses: Morphology, Taxonomy, and Implications for Grass Systematics and Fossil Phytolith Identification. *Smithsonian Contributions to Botany*. Number 85, pp. 1-40.

1998 Piperno, D.R., Holst, I.; The Presence of Starch Grains on Prehistoric Stone Tools from the Humid Neotropics: Indications of Early Tuber Use and Agriculture in Panama. *Journal of Archaeological Science* 25:765-776.

1998 Zhao, Z., Pearsall, D.m., Benfer, R.A., Jr., Piperno, D.R.; Distinguishing Rice (Oryza Sativa Poaceae) from Wild Oryza Species Through Phytolith Analysis, II: Finalized Method. *Economic Botany* 52:134-145.

1998 Kealhofer, L., Piperno, D.R.; Opal Phytoliths in Southeast Asian Flora. *Smithsonian Contributions to Botany*. Number 88, pp. 1-39.

1998 Piperno, D.R.; Paleoethnobotany in the Neotropics from Microfossils: Insights into Ancient Plant Use and Agricultural Origins in the Tropical Forest. *Journal of World Prehistory* 12:393-449.

1999 Jiang, Q., Piperno, D.R.; Environmental and Archaeological Implications of a Late Quaternary Palynological Sequence, Poyang Lake, Southern China. *Quaternary Research* 52:250- 258.

1999 Piperno, D.R.; The Origins and Development of Food Production in Pacific Panama, in *Pacific Latin America in Prehistory: The Evolution of Archaic and Formative Cultures*, edited by M. Blake. Washington State University Press, Pullman, Washington, pp. 123-134.

2000 Zhao, Z., Piperno, D.R.; Late Pleistocene/Holocene Environments in the Middle Yangtze River Valley, China and Rice (*Oryza sativa* L.) Domestication:The Phytolith Evidence *Geoarchaeology* 15:203-222.

2000 Piperno, D.R., Andres, T.C., Stothert, K.E.; Phytoliths in *Cucurbita* and other Neotropical Cucurbitaceae and their Occurrence in Early Archaeological Sites from the Lowland American Tropics. *Journal of Archaeological Science* 27:193-208.

2000 Piperno, D.R., Ranere, A.J., Holst, I., Hansell, P.; Starch Gains Reveal Early Root Crop Horticulture in the Panamanian Tropical Forest. *Nature* 407:894-897.

2001 Piperno, D.R., Flannery, K.V.; The Earliest Archaeological Maize (*Zea mays* L.) from Highland Mexico: New AMS Dates and Their Implications. *Proceedings of the National Academy of Sciences USA* 98:2101-2103.

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2001 Piperno, D.R.; On Maize and the Sunflower. *Science* 292:2260-2261.

2001 Sanjur, O., Piperno, D.R., Andres, T.C., Wessel-Beaver, L.; Phylogenetic Relationships Among Wild and Domesticated *Cucurbita* (Cucurbitaceae) Inferred from a mtDNA Gene: Implications for Crop Plant Evolution and Areas of Origin. *Proceedings of the National Academy of Sciences USA*. 99:535-540.

2001 Piperno, D.R.; Phytoliths, in *Tracking Environmental Changes in Lake Sediments*,

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2002 Piperno, D.R., Andres, T.C., Wessel-Beaver, L.; Evidence for the Control of Phytolith Formation in *Cucurbita* fruits by the Hard Rind (*Hr*) Genetic Locus: Archaeological and Ecological Implications. *Proceedings of the National Academy of Sciences USA* 99:10923-10928.

2003 Piperno. D.R., Jones J.; Paleoecological and Archaeological Implications of a Late Pleistocene/Early Holocene Record of Vegetation and Climate from the Pacific Coastal Plain of Panama. *Quaternary Research* 59:79-87.

2003 Piperno, D.R., Stothert, K.E.; Phytolith Evidence for Early Holocene *Cucurbita* Domestication in Southwest Ecuador. *Science* 299:1054-1057.

2003 Stothert, K.E., Piperno, D.R., Andres, T.C.; Terminal Pleistocene/Early Holocene Human Adaptation in Coastal Ecuador: The Las Vegas Evidence. *Quaternary International* 109-110:23-43.

2004 Piperno, D.R., Weiss, E., Holst, I., Nadel, D.; Processing of Wild Cereal Grains During the Upper Paleolithic Revealed by Starch Grain Analysis. *Nature* 430:670-673.

2004 Piperno, D.R.; Crop Domestication in the American Tropics: Phytolith Analyses, in *Dekker Encyclopedia of Crop and Plant Science*, edited by R.M. Goodman. Dekker, Inc., p.326.

2004 Piperno, D.R., Holst, I.; Crop Domestication in the American Tropics: Starch Grain Analyses, in *Dekker Encyclopedia of Crop and Plant Science*, edited by Robert M. Goodman. Dekker, Inc.,

2004 Lachniet, M., Burns, S.J., Piperno, D.R., et al. A 1500-year El Niño/Southern Oscillation and Rainfall History for the Isthmus of Panama from Speleothem Calcite. *Journal of Geophysical Research* 109:108-117.

2005 Sanjur, O., Piperno, D.R., Andres, T., Wessel-Beaver, L.; Using Molecular Markers to Study Plant Domestication: The Case of *Cucurbita,* in *Biomolecular Archaeology*, edited by D. M. Reed. Occasional Papers No. 32 of the Center for Archaeological Research, Southern Illinois University, Carbondale, Illinois, pp. 128-150.

2005 Piperno, D.R., Sues, H-D.; Dinosaurs Dined on Grass. *Science* 310:1126-1128.

2006 Piperno, D.R.; The Origins of Plant Cultivation and Domestication in the Neotropics: A Behavioral Ecological Perspective. in *Foraging Theory and the Transition to Agriculture*, edited by D. Kennett and B.Winterhalder, University of California Press, Berkeley, pp. 137-166.

Publications: Articles, Ctd.

2006 Perry, L., Sandweiss, D., Piperno, D.R., Rademaker, K., Malpass, M., Umire, A., de la Vera, P.; Early Maize Agriculture and Interzonal Interaction in Southern Peru. *Nature* 440:76-79.

2006 Piperno, D. R.; Identifying Manioc (*Manihot esculenta* Crantz) and Other Crops in Pre-Columbian Tropical America Through Starch Grain Analysis: A Case Study from Central Panama, in *Documenting Domestication: New Genetic and Archaeological Paradigms*, edited by M. Zeder, D. Bradley, E. Emschwiller, and B. Smith, University of California Press, Berkeley, pp. 46-67.

2006 Piperno, D. R.; Quaternary Environmental History and Agricultural Impact on Vegetation in Central America, in *Latin American Biogeography: Causes and Effects*, Proceedings of

the 51st Annual Systematics Symposium, edited by A. Graham and P. Raven. Missouri Botanical Garden Press, St .Louis, MO. 93: 274-293.

2006 Piperno, D.R.; *Nature Journal Club* 444:523. Invited article on banana domestication.

2007 Perry, L., Dickau, R., Zarrilo, S., Holst, I., Pearsall, D.M., Piperno, D.R. et al.; Starch Fossils and the Domestication and Dispersals of Chili Peppers (*Capsicum* sp.) in the Americas. *Science* 315:986-988.

2007 Pohl, M.D., Piperno, D.R., Pope, K., Jones, J.G., Microfossil Evidence for pre-Columbian Maize Dispersals in the Neotropics from San Andrés, Tabasco, Mexico. *Proceedings of the National Academy of Sciences USA* 104:6870-6875.

2007 Piperno, D.R., Moreno, J.E., Iriarte, J.E., Holst, I., Lachniet, M., Ranere, A.J., Castanzo, R.; Late Pleistocene and Holocene environmental history of the Iguala Valley, Central Balsas watershed of Mexico. *Proceedings of the National Academy of Sciences USA* 104:11874-11881.

2007 Piperno, D.R.; A Retrospective on Non-Affluent Foragers, in *The Emergence of Agriculture: A Global View*, edited by T. Denham and P. White, Routledge, New York, pp. 79-82.

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2008 Henry, A., Piperno, D.R.; Using Plant Microfossils from Dental Calculus to Recover Human Diet: A Case Study from Tell al-Raqâi, Syria. *Journal of Archaeological Science* 35:1943-1950.

2008 Piperno D. R; Paleoenvironmental Reconstruction in the Lowland Neotropics, in Encyclopedia of Archaeology, editor-in-chief, D.M. Pearsall, Academic Press, New York, pp. 1772-1787.

2008 Piperno, D.R., Dillehay, T.D.; Starch Grains Reveal Early Broad diet in Northern Peru. *Proceedings of the National Academy of Sciences USA* 105:19622-19627.

2009 Piperno, D.R., Ranere, A.J., Holst, I., Iriarte, J., Dickau, R.; Starch Grain and Phytolith Evidence for Early Ninth Millennium B.P. Maize from the Central Balsas

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2009 Piperno, D.R.; Identifying Crop Plants with Phytoliths (and Starch Grains) in Central and South America: A Review and an Update of the Evidence. *Quaternary International* 193:146-149.

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2009 Henry, A., Hudson, H.F., Piperno, D.R.; Changes in Starch Grain Morphologies from Cooking. *Journal of Archaeological Science* 36:915-922.

2010 Kennett, D., Piperno, DR. et al.; Pre-pottery Farmers on the Pacific Coast of Southern Mexico. *Journal of Archaeological Science* 37:3401-3411.

2011 Henry, A. Brooks, A., Piperno, D.R. Microfossils in Calculus Demonstrate Consumption of Plants and Cooked Foods in Neanderthal diets (Shanidar III, Iraq; Spy I and II, Belgium). *Proceedings of the National Academy of Sciences USA* 108:486-491.

2011 Piperno, D. R.; The Origins of Plant Cultivation and Domestication in the New World Tropics: Patterns, Process, and New Developments, in *The Beginnings of Agriculture: New Data, New Ideas*, edited by D. Price and O. Bar-Yosef. *Current Anthropology* 52 (S4) S453-470.

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Publications: Articles, Ctd.

2015 McMichael CH, Piperno DR, Bush MB (2015) Comment on Clement et al. 2015 'The domestication of Amazonia before European conquest'. *Proc. R. Soc. B* 282:20151837.

2015 Ball, T., et al. (16 authors contributed equally with author order alphabetical and Piperno no. 12). Phytoliths As a Tool for Investigations of Agricultural Origins and Dispersals Around the World. *Journal of Archaeological Science* 68:32-45.

2016 Piperno, D.R. Phytolith radiocarbon dating in archaeological and paleoecological research: a case study of phytoliths from modern Neotropical plants and a review of the previous dating evidence. *Journal of Archaeological Science* 68:54-61.

2016 Piperno, D.R. Standard evaluations of bomb curves and age calibrations along with consideration of environmental and biological variability show the rigor of phytolith dates on modern neotropical plants: Review of comment by Santos, Alexandre, and Prior. *Journal of Archaeological Science* 71:59-67.

2017 Piperno, D.R., Messner, T., Holst, I. Starch Grains. In *Where the Land Meets the Sea: Fourteen Millennia of Human Behavior at Huaca Prieta*, Peru, edited by T.D. Dillehay, University of Texas Press, Austin, pp. 683-688.

2017 Piperno, D.R., Messner, T., Holst, I. Starch Grains. In *Where the Land Meets the Sea: Fourteen Millennia of Human Behavior at Huaca Prieta*, Peru, edited by T.D. Dillehay, University of Texas Press, Austin, pp. 683-688.

2017 Lorant A, Pederson, S., Holst, I., Hufford, M.B., Winter, K., Piperno, D.R., Ross-Ibarra, J. The potential role of genetic assimilation during maize domestication. *PLoS One* https://doi.org/10.1371/journal.pone.0184202.

2017 Piperno, D.R. Assessing elements of an extended evolutionary synthesis for plant domestication and agricultural origin research. *PNAS* 114:6429–6437.

Publications in Press

McMichael, C.H., Feeley, K.J., , Dick, C.W., Piperno, D.R., Bush, M.B. The overlooked potential of post-Columbian influence on Amazonian vegetation. *Science*

Piperno, D.R. Early Holocene Plant Exploitation and Cultivation: Further Evidence from Phytoliths and Starch Grains. In *Las Vegas: The Early Holocene Human Occupation of Coastal Ecuador*, edited by K.E. Stothert and P. Stahl. Memoirs of Latin American Archaeology, University of Pittsburgh Press.

Publications: Miscellaneous

1990 Piperno, D.R. and Ciochon, R.L.; Scratching the Surface of Evolution. *New Scientist* 128:47-49.

1992 Piperno, D.R.; Let's Talk About Myth and Reality in Phytolith Research. *The Phytolitharien Newsletter* 7:7-10.

2001 Piperno, D.R.; The Occurrence of Genetically Controlled Phytoliths from Maize Cobs and Starch Grains from Maize Kernels on Archaeological Stone Tools and Human Teeth, and in Archaeological Sediments from Southern Central Aerica and Northern South America. *The Phytolitharien* 13:1-7.

Papers Read at Professional Conferences: 2005-Present

*2005 Quaternary Environmental History and Agricultural Impact on Vegetation in Central America. 51st Annual Systematics Symposium, Missouri Botanical Garden, St .Louis, MO.

*2007 Using Phytoliths and Starch Grains to Identify American Crop Plants: Case Studies from Central and South America.

*2008 New Archaeobotanical Information on Early Cultivation and Plant Domestication Involving Microplant Remains. Harlan II Symposium, Davis, California.

*2009 The Origins of Plant Cultivation and Domestication in the New World Tropics: Patterns, Process, and New Developments. Wenner-Gren sponsored symposium on the Origins of Agriculture, Merida, Mexico.

**2011 The Origins of New World Plant Cultivation and Domestication. NESCent (National Evolutionary Synthesis Centre) funded Catalysis meeting, Durham, North Carolina.

*2014 Amazonia and the Anthropocene: What Was the Spatial Extent and Intensity of Human Modification in the Amazon Basin at the End of Prehistory? Workshop "The Anthropocene in the Longue Durée sponsored by the Department of Anthropology, University of Texas, Austin.

*Invited Paper **Co-Organized the conference in which the paper was read.

Fellowships and Grants

1979 Smithsonian Student Fellowship, Smithsonian Tropical Research Institute, Panama.

1981 National Science Foundation Dissertation Improvement Grant, Principal Investigator, Dr. Anthony J. Ranere.

1981 Sigma Xi Grant-in-Aid of Research for Dissertation Research.

1981 Wenner-Gren Foundation Grant-in-Aid for Dissertation Research.

1983 Smithsonian Tropical Research Institute Postdoctoral Fellowship.

1984 Smithsonian Institution Fluid Research Award, Co-principal investigator, Stephen Hubbell.

1985 National Science Foundation Postdoctoral Fellowship, Environmental Biology Program.

1985 Wenner-Gren Foundation Grant-in-Aid.

1987 Wenner-Gren Foundation Conference Grant to Sponsor a Phytolith Research Workshop.

1989 National Science Foundation Grant (Anthropology Program, three years, Co-principal Investigator, Deborah M. Pearsall), $304,977.

1989 Smithsonian Institution Scholarly Studies Award (two years), $68,480.

1990 Andrew W. Mellon Foundation Grant (three years), $125,000.

1991 Grant from the Erna and Victor Hasselblad Foundation to purchase a scanning electron microscope for the Smithsonian Tropical Research Institute, $125,000.

1992 National Science Foundation Grant (Anthropology Program), $25,000.

1993 Andrew W. Mellon Foundation Grant (two years), $130,000.

1995 Andrew W. Mellon Foundation Grant (three years), $124,000.

1998 Smithsonian Institution Scholarly Studies Award (two years), $68,000.

1999 Andrew W. Mellon Foundation Grant (three years), $147,000.

2002 Andrew W. Mellon Foundation Grant (three years), $100,000**.**

2005 National Geographic Grant to carry out archaeological foot survey and excavations in the Balsas River Valley, Mexico, $20,000.

2005 National Science Foundation Senior Research Grant to reconstruct early human settlement and agricultural evolution in the Balsas River Valley, Mexico**, $**100,000.

Co-principal investigator with Anthony J. Ranere.

2007 National Science Foundation Senior Research Grant to reconstruct pre-historic human impacts on Amazonian environments, $410,000. Co-principal investigator with Mark B. Bush.

2010 NESCent (National Evolutionary Synthesis Center) grant to fund a conference titled "Domestication as an Evolutionary Phenomenon: Expanding the Synthesis". I was a co-leader of this effort held at the NESCent Center in Durham, North Carolina. Co-principal investigator with Greger Larson, Dorian Fuller, Robin Allaby, and Michael Purugganan.

2011 Smithsonian Institution Scholarly Studies Grant for the research project "Gene Expression, Environmental Inductions, and Maize Evolution: Broadening the Modern Synthesis for Domestication Research", $47,000.

2013 Wenner-Gren Foundation for Anthropological Research Grant for the project "Teosinte Domestication, Phenotypic Plasticity, and Late Pleistocene/Early Holocene Environments, $20,000.

Field Work

1977 - 1978; USA. Three field seasons excavating archaeological sites (one each in Illinois, Pennsylvania, New Jersey), where I was first a crew member and then a field supervisor for the Temple University Field School (Assumpink site, New Jersey).

1979; Ecuador. Paleoethnobotanist for excavations at the Las Vegas Culture type-site, Santa Elena Peninsula, Ecuador.

1979 – c. 1995; Panama. This work involved archaeology/paleoethnobotany, extracting sediment cores from lakes and swamps for paleoecological investigations, floral and economic plant surveys, and collecting modern analog plant and sediment samples for phytolith and starch grain research.

Archaeology/Paleoethnobotany; I was first a crew member (excavations in 1979) and then a field supervisor (Proyecto Santa Maria in 1981-1982) conducting transect and purposive site surveys, and evaluation, mapping, and excavations of sites in Central Panama. I then was field director for site survey, testing, and excavations on Barro Colorado Island in 1984-1985, and site survey in the Monte Oscuro region in 1993-1995. I co-directed the re-excavation of the Aguadulce Rock Shelter in 1997.

Paleoecological Studies; I assisted in the extraction of sediment cores from Lakes Charca and La Yeguada in 1985. I was co-field director for the extraction of sediment cores from Lakes La Yeguada in1987, El Valle in 1988, and the Darien region in 1988. I was field director for the extraction of sediment cores from swamps and terrestrial deposits on Barro Colorado Island in 1984-1985, and sediment cores from Lakes Monte Oscuro in 1993 and 1994, and El Valle and Bocaca in 1994.

1983; Colombia. Studies of prehistoric occupations and relict agricultural fields in the middle Cauca Valley.

1987; Guanacaste, Costa Rica. Collecting modern analog plant and sediment samples for phytolith research.

1999-2005; Mexico. Seven field seasons. I was field director and co-principal investigator for a project that involved the reconstruction of Late Pleistocene

through modern vegetation and climate as well as early human settlement, subsistence, and agricultural evolution in the Central Balsas River Valley of Mexico.

2009-Present; A project carried out in Panama concerned with growing teosinte, the wild ancestor of maize, under the temperature and atmospheric CO_2 conditions that prevailed during the late-glacial and early Holocene periods. The goal is to test new evolutionary hypotheses concerned with gene expression and plasticity, and their influences on phenotypic change in plant domestication, and assess plant productivity before and at the dawn of agriculture.

Professional Service and Activities 2007-Present

2013-present. Associate Editor, *Journal of Archaeological Science*

2013-present. Editorial Board Member, *Scientific Reports*

2011. Review Panel for the Anthropology and Archaeology Panel of the Ford Foundation Fellowship Programs.

2011. Member of the National Museum of Natural History review panel for the Professional Accomplishment Evaluation assessments.

2010-present. Consulting scientist for the Clergy Letter Project.

2009. Nominating Committee of the National Academy of Sciences (concerned with choosing candidates to run for election to the NAS Council).

2009-present. Associate Editor of *Proceedings of the National Academy of Sciences USA*.

2009-2011. Electorate Nominating Committee of the American Association for the Advancement of Science for the Section on Anthropology.

2008-2009. Nominating Committee for the Class III, Section 5 Membership Panel of the American Academy of Arts and Sciences (concerned with advancing scholars to formal candidacy for election to the American Academy).

2008-2012. On search committees for scientific job hires at the National Museum of Natural History and the Smithsonian Tropical Research Institute, and for Editor-in-Chief of *PNAS*.

2008-2013. Editorial Board Member, *Journal of Archaeological Science*.

2007-present. Editorial Board Member, *Proceedings of the National Academy of Sciences USA*.

2007-2009. Editor, Bulletin of the Society for Phytolith Research.

Association Memberships

American Association for the Advancement of Science
Society for American Archaeology
Society for Phytolith Research (Founding Member and Charter President)

References

Dr. Anthony J. Ranere, Professor, Department of Anthropology, Temple University, Philadelphia, 19122. Email: ranere@temple.edu

Dr. Daniel Sandweiss, Dean and Associate Provost for Graduate Studies, Professor of

Anthropology and Quaternary & Climate Studies, 120 Alumni Hall, University of Maine Orono ME 04469. Email: Dan_Sandweiss@umit.maine.edu

Dr. Thomas D. Dillehay, Professor, Department of Anthropology, Vanderbilt University, Nashville, TN, 37235-7749. Email: Tom.D.Dillehay@Vanderbilt.Edu