# Curriculum Vitae Yang Wang

September 13, 2018

## **General Information**

University address: Department of Earth, Ocean & Atmospheric Science, College of Arts and Sciences

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# **Professional Preparation**

1992 Ph.D., University of Utah, Salt Lake City, UT. Major: Geology. Supervisor: Dr. Thure Cerling.

1986 M.S., Peking University, Beijing, PR China. Major: Geochemistry. Supervisor: Shuhui Zheng.

1983 B.S., Peking University, Beijing, PR China. Major: Geochemistry. Supervisor: Benli Liu

# **Nondegree Education and Training**

1992–1995 Post-doctoral researcher, University of California, Berkeley.

Advisor: Dr. Ronald Amundson

#### **Professional Experience**

8/09 – present	Professor, Department of Earth, Ocean, & Atmospheric Science,
	Florida State University
8/02 – 7/09	Associate Professor, Department of Geological Sciences, Florida

State University

12/95 – 7/02 Assistant Professor, Department of Geological Sciences, Florida

State University

## Honors, Awards, and Prizes

2014 Excellent Associate Editor Award, Science Bulletin (2015).

2014 Excellent Associate Editor Award, SCIENCE CHINA Earth Sciences (2015).

#### **Elected Fellow Status**

Elected as a Fellow of Geological Society of America (2015).

## **Current Membership in Professional Organizations**

American Geophysical Union Geological Society of America (Fellow) International Professionals for Advancement of Chinese Earth Sciences

## **Teaching**

## **Courses Taught**

Introductory Earth Science (ESC 1000)
Stable Isotopic Tracers in the Environment (GLY5267)
Advanced Topics in Geochemistry (GLY5297)
Dynamic Earth (GLY1000)
Living on the Water Planet (GLY1070)
Advanced Topics in Geochemistry (GLY5298)
Doctoral Seminar (GLY6982)

#### Doctoral and Master's Committee Chair/co-Chair

- Megan Morsey (M.S., 2001); Thesis title: "Effects of forestry management on carbon sequestration in soils in north Florida."
- Yonghoon Choi (Ph. D., 2002); Dissertation title: "Quantification of the rate of carbon cycling in a coastal wetland in northwest Florida."
- Jennifer Stern (Ph.D., 2005, co-Chair with Vincent Salters); Dissertation title: "Biogeochemical cycling of carbon, phosphorus, and trace metals."
- Elizabeth Moulton Kromhout (M.S., 2007); Thesis title: "Altitude effect on the stable isotope chemistry of tooth enamel from modern herbivores in Tibet: Implications for paleoclimate and paleoelevation reconstructions".
- Dana Biasatti (Ph.D., 2009); Dissertation title: "Paleoenvironments and Paleoecologies of Cenozoic Mammals from Western China Based on Stable Carbon and Oxygen Isotopes."
- Mabry Gaboardi (Ph.D., 2009; co-advisor with Munir Humayun); Dissertation title: "Geochemical analyses of paleoenvironments and processes: Peking Man to Stardust".
- Xin Li (Ph.D., 2009); Dissertation title: "Tracing the flow of phosphorus, carbon and nitrogen in aquatic ecosystems".
- Burcu Ciner Gurbuz (M.S., 2010); Project title: "An isotopic record of late Cenozoic diet, habitat and climate change from northern China".
- Christopher Odezulu (M.S., 2011); Project title: "Stable hydrogen and oxygen isotopic variations in natural waters in North Florida: Implications for hydrological and paleoclimatic studies"

- Chunfu Zhang (Ph.D., 8/2011); Dissertation title: "Late Cenozoic C4 Expansion in the Central Inner Mongolia and Paleoenvironmental Evolution of the Qaidam Basin, China".
- Sofia Khawaja (Ph. D., 5/2012; co-Chair with Roy Odom); Project title: "Investigation of Mercury, Carbon and Oxygen isotopes in the environment"
- Oindrila Das (Ph.D., 12/2012); Project title: "Applications of organic geochemical proxies in the environment".
- Burcu Ciner (Ph.D., 12/2013); Project title: "Stable carbon and oxygen isotopes in Cetacean teeth and bones and in terrestrial herbivores as indicators of diet, movement and environment: paleoceanographic, Paleoclimatic, and paleoecologic applications".
- Chelsie Bowman (M.S., 2015); Project title: "Paleodietary reconstruction of late Miocene herbivores from the Dove Spring Formation"
- Erica Rau (M.S., 2016, co-Chair with Jeff Chanton); Project title: "The use of stable isotopes deuterium and oxygen-18 as natural hydrologic tracers in a Florida springshed".
- Shannon Stacklyn (M.S., 2016); Project title: "Stable isotopic evidence for diets and niche differentiation of early Pleistocene panda and associated mammals from Yanliang Cave, South China".
- Rupsa Roy (Ph.D., 2017; co-Chair with Vincent Salters); Project Title: "Geochemical study of mantle processes and paleoclimate reconstruction: perspective from mantle xenoliths and modern freshwater snail shells"
- Fajun Sun (PhD candidate in geology); Tentative project title: "Isotopic evidence for diet and environmental changes in South China".
- Shakura Jahan (PhD candidate in geology); Project title: "Reconstruction of Paleo-Storm History Using Geochemical Proxies in Coastal Lake Sediments"
- Chance Hannold (M.S. candidate in geology); Project title: "Carbon and Oxygen Isotopes of Fossil Mammals: Evidence for the Evolution of C<sub>4</sub> Grasslands and Environmental Change in Yepómera, Chihuahua. Mexico"

#### **Doctoral and Master's Committee Member**

Holly Williams (M.S., 1999)

Jingfen Li (M.S., 2000)

Dongwook Kim (M.S. in Chemistry, 2000)

Lynda C. Chasar (Ph.D. in oceanography, 2002)

James Arney (M.S, 2002)

Kevin Dillon (Ph.D. in oceanography, 2003)

Neal Doran (Ph.D., 2003)

Jeroen Sonke (Ph. D., 2003)

Jim Prater (Ph. D. in oceanography, 2005)

Muriel Hannion (M.S., 2006)

Kristeen Roessig (Ph.D., 2007)

Daniel Seinfeld (M.S. in Anthropology, 2007)

Shijun Jiang (Ph. D., 2007)

Sangamitra Ghosh (Ph. D., 2008)

Denise Kulhanek (Ph.D., 2009)

Andrew Kowalczk (M.S. in Oceanography, 2009)

Rachel Younge Wilson (Ph.D. in Oceanography, 2010)

Sulata Ghosh (Ph.D., 2010)

Ayca Dogrul (M.S., 2010)

Darrel Tremaine (M.S., 2010)

Juxiu Tong (Ph.D., 2010)

Stacie Blair (Ph.D., 2010)

Linda Fitzhugh (Ph.D. in Oceanography, 2011)

Raoul Fernandes (M.S., 2011)

Aisha Ejura Agbali (M.S., 2011)

Hana Millen (M.S., 2012)

Jane Liz Corbett (Ph.D. in Oceanography, 2012)

Jennifer Coor (Ph.D. in geology, 2012)

Mohammed Aljahdali (M.S. in geology, Spring 2013)

Nick Myers (M.S. in geology, Spring 2013)

Aleta M. Mitchell-Tapping (Ph.D. in geology, Spring 2013)

Amanda Tazaz (Ph.D. in Oceanography, Fall 2013)

Philip Bambach (M.S. in geology, Fall 2013)

Jay Daniel Goddard (M.S. in geology, Spring 2014)

Tugba Sezen (M.S. in geology, Summer 2014)

Aisha Ejura Agbali (Ph.D. in geology, Summer 2014)

Marie Peterson (M.S. in geology, Fall, 2014)

Kelsey Rogers (M.S. in oceanography, Fall, 2014)

Aaron Avery (M.S. in geology, Fall 2014)

Ravi Sankar (Ph. D. in geology, Spring 2015)

Jarrett Cruz (M.S. in geology, summer 2015)

Alex Harper (Ph.D. in Oceanography, Spring 2016)

Suzanne Hodgkins (Ph.D. in Oceanography, Spring 2016)

Sonay Bozkurt (M.S. in geology, summer 2015)

Ekin Ozakar (M.S. in geology, summer 2015)

Seher Unlu (M.S. in geology, Fall 2015)

Mohammed Aljahdali (Ph.D., 2016)

Mohammed Marza (M.S., 2016)

Zhongyuan Xu (M.S. in geology, Spring 2017)

Kelsey Rogers (Ph.D. in Oceanography, Spring 2018)

Jarrett Cruz (Ph.D. candidate in geology)

Chelsie Bowman (Ph.D. candidate in geology)

Rehab Salem (Ph.D. candidate in geology)

Megan Shelfer (M.S. candidate in geology)

Randall Funderburk (M.S. candidate in geology)

Emily Benayoun (M.S. candidate in geology)

Brian Wood (Ph.D. candidate in geology)

Nevin Kozik (Ph.D. candidate in geology)

Terryl Bandy (M.S. candidate in geology)

Ye Peng (Ph.D. candidate in geology)

## **Doctoral Committee University Representative**

Fitzhugh, L. M., graduate. (2011).

Prater, J., graduate. (2005).

Dillon, K., graduate. (2003).

Chasar, L., graduate. (2002).

## **Bachelor's Committee Member**

Lesley S. Glass (B.S. honors thesis, 1998)

Matthew Wissler (B.S. honors thesis, 2000)

Jaymee Norman (Honors thesis, Anthropology, 2010): Research project title: "Exploring Maya Foodways Through Bulk Stable Carbon Isotope Analysis of Ancient Ceramics"

#### Supervision of visiting PhD student

- Liu, J. (2015–2016). I served as Advisor for visiting PhD student Jin Liu from Chinese Academy of Geological Sciences (8/2015 12/2016). Her research and study at FSU has resulted in a publication in the international journal "Quaternary International" (Liu et al., 2018; DOI: 10.1016/j.quaint.2016.12.015).
- Wu, X. (2015–2017). I served as Advisor for visiting PhD student Xiujie Wu from Chinese University of Geosciences (8/2015 6/2017). Her work at FSU has resulted in one publication in the international journal "Hydrology and Earth System Sciences" (Wu et al., 2017; DOI: 10.5194/hess-21-4419-2017).

## **Supervision of Student Research Not Related to Thesis or Dissertation**

Dignan, M. (Jun–Aug 2015).
Natal, J. (Jun–Aug 2015).
Dennis, H. (Jun–Aug 2014).
Natal, J. (Jun–Aug 2014).
Walker, J. (Sep 2012–Apr 2013).
Goddard, J. D. (Aug 2008–May 2009).

# **Research and Original Creative Work**

#### **Publications**

## **Refereed Journal Articles (STUDENT AUTHORS UNDERLINED)**

- <u>Biasatti, D.</u>, Wang, Y., & Deng, T. (in press). Paleoecology of Cenozoic rhinos from northwest China: a stable isotope perspective. *Vertebrata PalAsiatica*, 24 pages.
- Wang, Y., <u>Das, O.</u>, Xu, X., Liu, J., <u>Jahan, S.</u>, Means, G. H., Donoghue, J., & Jiang, S. (in press). Radiocarbon Ages of Organic and Inorganic Carbon in Coastal Lakes in Florida: Implications for Establishing Reliable Chronology for sediment-based paleoclimate reconstruction. *Quaternary Research*.
- <u>Liu, J.</u>, Wang, Y., Wang, Y., Guan, Y., Dong, J., & Li, T. (2018). A multi-proxy record of environmental changes during the Holocene from the Haolaihure Paleolake sediments, Inner Mongolia. *Quaternary International*, 479, 148-159. doi:10.1016/j.quaint.2016.12.015
- Wang, J., Chapman, D., Xu, J., Wang, Y., & Gu, B. (2018). Isotope Niche Dimension and Trophic Overlap between Bigheaded Carps and Native Filter-Feeding Fish in the Lower Missouri River, USA. *PLoS ONE*, *13*(5), e0197584. Retrieved from https://doi.org/10.1371/journal.pone.0197584 doi:10.1371/journal.pone.0197584
- Zhang, A., Wen, X., Yan, H., He, X., Su, H., Tang, H., Jordan, R. W., Wang, Y., & Jiang, S. (2018). Response of microalgae to large-seaweed cultivation as revealed by particulate organic matter from an integrated aquaculture off Nan'ao Island, South China. *Marine Pollution Bulletin*, *133*, 137-143. Retrieved from https://doi.org/10.1016/j.marpolbul.2018.05.026 doi:10.1016/j.marpolbul.2018.05.026
- Bowman, C., Wang, Y., Wang, X., Takeuchi, G., Faull, M., Whistler, D., & Kish, S. (2017). Pieces of the puzzle: Lack of significant C4 in the late Miocene of southern California. *Palaeogeography*, *Palaeoclimatology*, *Palaeoecology*, *475*, 70–79. doi:10.1016/j.palaeo.2017.03.008.
- Stacklyn, S., Wang, Y., Jin, Chang-zhu, Wang, Y., Sun, F., Zhang, C., Jiang, S., & Deng, T. (2017). Carbon and oxygen isotopic evidence for diets, environments and niche differentiation of early

- Pleistocene pandas and associated mammals in South China. *Palaeogeography, Palaeoclimatology, Palaeoecology, 468*, 351–361. doi:10.1016/j.palaeo.2016.12.015.
- Wu, X., Wang, X., Wang, Y., & Hu, B. X. (2017). Origin of water in the Badain Jaran Desert, China: New insight from isotopes. *Hydrology and Earth System Sciences*, 21, 4419–4431. Retrieved from www.hydrol-earth-syst-sci.net/21/4419/2017/ doi:10.5194/hess-21-4419-2017
- Ciner, B., Wang, Y., & Parker, W. (2016). Oxygen Isotopic Variations in Modern Cetacean Teeth and Bones: Implications for Ecological, Paleoecological and Paleoclimatic Studies. *Science Bulletin*, 61(1), 92–104. doi:10.1007/s11434-015-0921-x.
- Lei, Y., Jiang, S., Wise, S. W., Cui, Y., & Wang, Y. (2016). Contrasting response of the calcareous nannoplankton communities after the Eocene hyperthermal events in the tropical Atlantic Ocean. *Marine Micropaleontology*, 129, 24–31. doi:10.1016/j.marmicro.2016.11.001.
- Ciner, B., Wang, Y., Deng, T., Flynn, L., Hou, S., & Wu, W. (2015). Stable Carbon and Oxygen Isotopic Evidence for Late Cenozoic Environmental Change in Northern China. *Palaeogeography*, *Palaeoclimatology*, *Palaeoecology*, *440*, 750 762. doi:10.1016/j.palaeo.2015.10.009.
- Wang, J., Gu, B., Ewe, S. M. L., Wang, Y., & Li, Y. (2015). Stable isotope compositions of aquatic flora as indicators of wetland eutrophication. *Ecological Engineering*, 83, 13-18. doi:10.1016/j.ecoleng.2015.06.007
- Wang, X., Wang, Y., Li, Q., Tseng, Z. J., Takeuchi, G., Deng, T., Xie, G., Chang, Mee-mann, & Wang, N. (2015). Cenozoic vertebrate evolution and paleoenvironment in Tibetan Plateau: Progress and prospects. *Gondwana Research*, 27, 1335–1354. DOI: 10.1016/j.gr.2014.10.014
- Wang, Y., Gu, B., Lee, Ming-Kuo, Jiang, S., & Xu, Y. (2014). Isotopic evidence for anthropogenic impacts on aquatic food web dynamics and mercury cycling in a subtropical wetland ecosystem in the US. *Science of the Total Environment*, 487, 557-564. DOI: 10.1016/j.scitotenv.2014.04.060.
- Zhang, L., Li, M., Wang, Y., Yin, Q., & Zhang, W. (2013). A novel molecular index for secondary oil migration distance. *Scientific Reports*, *3*, 1-8. Retrieved from www.nature.com/scientificreports doi:10.1038/srep02487
- Wang, Y., Xu, Y., <u>Khawaja, S.</u>, Passey, B., Zhang, C., Wang, X., Li, Q., Tseng, Z., Takeuchi, G., Deng, T., & Xie, G. (2013). Diet and environment of a mid-Pliocene fauna from southwestern Himalaya: Paleo-elevation implications. *Earth and Planetary Science Letters*, *376*, 43-53. Retrieved from www.elsevier.com/locate/epsl doi:10.1016/j.epsl.2013.06.014
- Lee, M. K., Natter, M., Keevan, J., Guerra, K., Saunders, J., Uddin, A., Humayun, M., Wang, Y., & Keimowitz, A. R. (2013). Assessing Effects of Climate Change on Biogeochemical Cycling of Trace Metals in Alluvial and Coastal Watersheds. *British Journal of Environment and Climate Change*, *3*, 44-66. Retrieved from www.sciencedomain.org
- Das, O., Wang, Y., Donoghue, J., Xu, X., Coor, J., Elsner, J., & Xu, Y. (2013). Reconstruction of

- paleostorms and paleoenvironment using geochemical proxies in sediment cores from two coastal lakes in northwest Florida. *Quaternary Science Reviews*, 68, 142-153. Retrieved from http://dx.doi.org/10.1016/j.quascirev.2013.02.014
- Wang, X., Li, Q., Xie, G., Saylor, J., Tseng, Z., Takeuchi, G., Deng, T., Wang, Y., Hou, S., Liu, J., Zhang, C., Wang, N., & Wu, F. (2013). Mio-Pleistocene Zanda Basin biostratigraphy and geochronology, pre-Ice Age fauna, and mammalian evolution in western Himalaya. *Palaeogeography, Palaeoclimatology, Palaeoecology, 374*, 81–95. Retrieved from http://dx.doi.org/10.1016/j.palaeo.2013.01.007
- <u>Biasatti, D.</u>, Wang, Y., Gao, F., Xu, Y., & Flynn, L. (2012). Paleoecologies and Paleoclimates of Cenozoic Mammals from Southwest China: Evidence from Stable Carbon and Oxygen Isotopes. *Journal of Asian Earth Sciences*, 44, 48-61. doi:10.1016/j.jseaes.2011.04.013.
- Deng, T., Li, Q., Tseng, Z. J., Takeuchi, G., Wang, Y., Xie, G., Wang, S., Hou, S., & Wang, X. (2012). Locomotive implication of a Pliocene three-toed horse skeleton from Tibet and its paleo-altimetry significance. *PNAS*, 109 (19), 7374-7378. doi:10.1073/pnas.1201052109
- Natter, M., Keevan, J., Wang, Y., Keimowitz, A., Okeke, B., Son, A., & Lee, M. G. (2012). Level and Degradation of Deepwater Horizon Spilled Oil in Coastal Marsh Sediments and Pore-Water. *Environmental Science & Technology*, 46, 5744-5755. doi:10.1021/es300058w
- Wang, Y., Deng, T., Flynn, L., Wang, X., An, Y., Xu, Y., Parker, W., Lochner, E., <u>Zhang, C.</u>, & Biasatti, D. (2012). Late Neogene environmental changes in the central Himalaya related to tectonic uplift and orbital forcing. *Journal of Asian Earth Sciences*, 44, 62-76. doi:10.1016/j.jseaes.2011.05.020
- Zhang, C., Wang, Y., Li, Q., Wang, X., Deng, T., Tseng, Z., Takeuchi, G., Xie, G., & Xu, Y. (2012). Diets and environments of late Cenozoic mammals in the Qaidam Basin, Tibetan Plateau: evidence from stable isotopes. *Earth and Planetary Science Letters*, 333-334, 70-82. Retrieved from http://dx.doi.org/10.1016/j.epsl.2012.04.013 doi:10.1016/j.epsl.2012.04.013
- Chen, G., Wu, Z., Gu, B., Li, X., & Wang, Y. (2011). Isotopic niche overlap of two planktivorous fish in southern China. *Limnology*, *12*, 151-155. doi:10.1007/s10201-010-0332-2.
- Deng, T., Wang, X., Fortelius, M., Li, Q., Wang, Y., Tseng, Z., Takeuchi, G., Saylor, J., Säilä, L., & Xie, G. (2011). Out of Tibet: Pliocene Woolly Rhino Suggests High-Plateau Origin of Ice Age Megaherbivores. *Science*, 333, 1285-1288. doi:10.1126/science.1206594
- Flynn, L., Deng, T., Wang, Y., Xie, G., <u>Hou, S., Pang, L.</u>, Wang, T., & Mu, Y. (2011). Observations on the Hipparion Red Clays of the Loess Plateau. *Vertebrata PalAsiatica*, 49, 275-284.
- <u>Li, X., Wang, Y., Stern, J., & Gu, B. (2011)</u>. Isotopic evidence for the source and fate of phosphorus in Everglades wetland ecosystems. *Applied Geochemistry*, *26*, 688–695. doi:10.1016/j.apgeochem.2011.01.027
- Tremaine, D., Froelich, P., & Wang, Y. (2011). Speleothem calcite farmed in situ: Modern calibration of

- δ18O and δ13C paleoclimate proxies in a continuously-monitored natural cave system. *Geochimica et Cosmochimica Acta*, 75, 4929–4950. doi:10.1016/j.gca.2011.06.005.
- Wang, X., Xie, G., Li, Q., Qiu, Z., Tseng, Z., Takeuchi, G., Wang, B., Fortelius, M., Fortelius, A., Downs, W., Zhang, C., & Wang, Y. (2011). Early explorations of Qaidam Basin (Tibetan Plateau) by Birger Bohlin—Reconciling classic vertebrate fossil localities with modern biostratigraphy. *Vertebrata PalAsiatica*, 49, 1-11.
- <u>Biasatti, D.,</u> Wang, Y., & Deng, T. (2010). Strengthening of the East Asian summer monsoon revealed by a shift in seasonal patterns in diet and climate after 2-3 Ma in northwest China. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 297, 12-25. doi:10.1016/j.palaeo.2010.07.005.
- <u>Das, O.</u>, Wang, Y., & Hsieh, Y. P. (2010). Chemical and carbon isotopic characteristics of ash and smoke derived from burning of C3 and C4 grasses. *Organic Geochemistry*, *41*, 263-269. doi:10.1016/j.orggeochem.2009.11.001
- Jin, Z., Zhang, L., Wang, Y., Cui, Y., & Milla, K. (2009). Using carbon, hydrogen and helium isotopes to unravel the origin of hydrocarbons in the Wujiaweizi area of the Songliao Basin, China. *Episodes*, 32, 167-176.
- Zhang, C., Wang, Y., Deng, T., Wang, X., Biasatti, D., Xu, Y., & Li, Q. (2009). C4 Expansion in the central Inner Mongolia during the latest Miocene and early Pliocene. *Earth and Planetary Science Letters*, 287, 311-319. doi:10.1016/j.epsl.2009.08.025
- Wang, Y., <u>Kromhout, E., Zhang, C.</u>, Xu, Y., Parker, W., Deng, T., & Qiu, Z. (2008). Stable isotopic variations in modern herbivore tooth enamel, plants and water on the Tibetan Plateau: Implications for paleoclimate and paleoelevation reconstructions. *Palaeogeography, Palaeoeclimatology, Palaeoecology*, 260, 359-374. doi:10.1016/j.palaeo.2007.11.012.
- Wang, Y., Wang, X., Xu, Y., Zhang, C., Li, Q., Tseng, Z. J., Takeuchi, G., & Deng, T. (2008). Stable isotopes in fossil mammals, fish and shells from Kunlun Pass Basin, Tibetan Plateau: Paleoclimatic and paleo-elevation implications. *Earth and Planetary Science Letters*, 270, 73-85. doi:10.1016/j.epsl.2008.03.006.
- <u>Jiang, S., Wise, S. W., & Wang, Y. (2007).</u> Cause of the Middle/Late Miocene Carbonate Crash: Dissolution or Low Productivity? *Proc. ODP Sci. Results*, *206*, 1-24. doi:10.2973/odp.proc.sr.206.013.2007
- Lee, M. K., Griffin, J., Saunders, J., Wang, Y., & Jean, J. S. (2007). Reactive Transport of Trace Elements and Isotopes in the Eutaw Coastal Plain Aquifer, Alabama. *Journal of Geophysical Research*, *112*, G02026. doi:10.1029/2006JG000238
- Stern, J., Wang, Y., Gu, B., & Newman, J. (2007). Distribution and turnover of carbon in natural and constructed wetlands in the Florida Everglades. *Applied Geochemistry*, 22, 1936-1948. doi:10.1016/j.apgeochem.2007.04.007.

- Wang, X., Qiu, Z. D., Li, Q., Wang, B., Qiu, Z. X., Downs, W., Wang, Y., Xie, G., et al. (2007). Vertebrate paleontology, biostratigraphy, geochronology, and paleoenvironment of Qaidam Basin in northern Tibetan Plateau. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 254, 363-385. doi:10.1016/j.palaeo.2007.06.007.
- Ewing, S. A., Sanderman, J., Baisden, W. T., Wang, Y., & Amundson, R. (2006). Role of large-scale soil structure in organic carbon turnover: Evidence from California grassland soils. *J. Geophys. Res*, 111, G03012. doi:10.1029/2006JG000174.
- Wang, Y., Deng, T., & <u>Biasatti, D.</u> (2006). Ancient diets indicate significant uplift of southern Tibet after ca. 7 Ma. *Geology*, *34*, 309-312. doi:10.1130/G22254.1.
- Gaboardi, M., Deng, T., & Wang, Y. (2005). Middle Pleistocene climate and habitat change at Zhoukoudian, China, from the carbon and oxygen isotopic record from herbivore tooth enamel. *Quaternary Research*, 63, 329-338. doi:10.1016/j.ygres.2005.02.006
- Wang, Y., & Deng, T. (2005). A 25 m.y. isotopic record of paleodiet and environmental change from fossil mammals and paleosols from the NE margin of the Tibetan Plateau. *Earth and Planetary Science Letters*, 236, 322-338. doi:10.1016/j.epsl.2005.05.006
- Choi, Y., & Wang, Y. (2004). Dynamics of carbon sequestration in a coastal wetland using radiocarbon measurements. *Global Biogeochemical Cycles*, 18(4), GB4016. doi:10.1029/2004GB002261
- Wang, Y., & Hsieh, Y. P. (2002). Uncertainties and novel prospects in the investigation of the soil carbon dynamics. *Chemosphere*, 49, 791-804.
- Deng, T., Dong, J. S., & Wang, Y. (2002). Variation of terrestrial ecosystem recorded by stable carbon isotopes of fossils in northern China during the Quaternary. *Chinese Science Bulletin*, 47(1), 76-78.
- Rogers, K., & Wang, Y. (2002). Late Matuyama Climate Shift in the Southern Rocky Mountains: Evidence from Carbon and Oxygen Stable Isotope Ratios in Pleistocene Pocket Gopher Teeth (Colorado, New Mexico). *Quaternary Research*, 57, 200-207.
- Wang, Y., Hsieh, Y. P., Landing, W., <u>Choi, Y.,</u> Salters, V., & Campbell, D. (2002). Chemical and carbon isotopic evidence for the source and fate of dissolved organic matter in the Florida Everglades. *Biogeochemisty*, 61, 269-289.
- Choi, Y., Wang, Y., Hsieh, Y., & Robinson, L. (2001). Carbon sequestration and vegetation succession in a coastal wetland: Evidence from carbon isotopes. *Global Biogeochemical Cycles*, *15*, 311-320.
- Wang, Y., Amundson, R., & Niu, X. (2000). Seasonal and altitudinal variation in decomposition of soil organic matter inferred from radiocarbon measurements of soil CO2 flux. *Global Biogeochemical Cycles*, *14*, 199-211.
- Wang, Y., Amundson, R., & Trumbore, S. (1999). The impact of land-use change on C turnover in soils.

- Global Biogeochemical Cycles, 13, 47-57.
- Amundson, R., Stern, L., Baisden, T., & Wang, Y. (1998). The isotopic composition of soil and soil-respired CO2. *Geoderma*, 82, 83-114.
- Wang, K., Chatterton, B., & Wang, Y. (1997). An organic carbon isotope record of Late Ordovician to Early Silurian marine sedimentary rocks, Yangtze Sea, South China: Implications for CO2 changes during the Hirnantian glaciation. *Palaeogeography, Palaeoclimatology, Palaeoecology,* 132, 147-158.
- Wang, Y., Jahren, H., & Amundson, R. (1997). Potential for 14C Dating of Biogenic Carbonate in Hackberry (Celtis) Endocarps. *Quaternary Research*, 47, 337-343.
- Amundson, R., Chakwick, O., Kendall, C., Wang, Y., & DeNiro, M. (1996). Isotopic evidence for shifts in atmospheric circulation patterns during the late Quaternary in mid-North America. *Geology*, 24, 23-26.
- Slate, J., Smith, G., Wang, Y., & Cerling, T. E. (1996). Carbonate-paleosol genesis in the Plio-Pleistocene St. David Formation, Southeastern Arizona. *Journal of Sedimentary Research*, 66, 85-94.
- Wang, Y., McDonald, E., Amundson, R., McFadden, L., & Chadwick, O. (1996). An isotopic study of soils in chronological sequences of alluvial deposits, Providence Mountains, California. *Geological Society of America Bulletin*, 108, 379-391.
- Wang, Y., Amundson, R., & Trumbore, S. (1996). Radiocarbon dating of soil organic matter. *Quaternary Research*, 45, 282-288.
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- Cerling, T. E., Quade, J., & Wang, Y. (1994). Expansion and emergence of C4 plants. *Nature*, 371, 112.
- MacFadden, B. J., Wang, Y., Cerling, T. E., & Anaya, F. (1994). South American fossil mammals and carbon isotopes: a 25 million-year sequence from the Bolivian Andes. *Palaeogeography*, *Palaeoclimatology*, *Palaeoecology*, *107*, 257-268.
- Wang, Y., Amundson, R., & Trumbore, S. (1994). A model for soil 14CO2 and its implications for using 14C to date pedogenic carbonate. *Geochimica et Cosmochimica Acta*, 58, 393-399.
- Wang, Y., & Cerling, T. E. (1994). A model of fossil tooth and bone diagenesis: Implications for paleodiet reconstruction from stable isotopes. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 107, 281-289.
- Wang, Y., Cerling, T. E., & MacFadden, B. J. (1994). Fossil horses and carbon isotopes: new evidence

- for Cenozoic dietary, habitat, and ecosystem changes in North America. *Palaeogeography, Palaeoclimatology, Palaeoecology, 107*, 269-279.
- Cerling, T. E., Wang, Y., & Quade, J. (1993). Expansion of C4 ecosystems as an indicator of global ecological change in the late Miocene. *Nature*, *361*, 344-345.
- Smith, G. A., Wang, Y., Cerling, T. E., & Geissman, J. W. (1993). Comparison of a paleosol-carbonate isotope record to other records of Pliocene-early Pleistocene climate in the western United States. *Geology*, *21*, 691-694.
- Wang, Y., Amundson, R., & Trumbore, S. (1993). Processes controlling 14CO2 in soils: model development. *Chemical Geology*, 107, 225-226.
- Wang, Y., Cerling, T. E., & Effland, B. (1993). Stable isotope ratios of soil carbonate and soil organic matter as indicators of forest invasion of prairie near Ames, Iowa. *Oecologia*, 95, 365-369.
- Rogers, K., Larson, E. E., Smith, G., Katzman, D., Cerling, T. E., Wang, Y., Baker, R. G., Lohmann, K. C., Repenning, C. A., et al. (1992). Pliocene and Pleistocene geologic and climatic evolution in the San Luis Valley of south-central Colorado. *Palaeogeography, Palaeoclimatology, Palaeoecology*, *94*, 55-86.
- Cerling, T. E., Quade, J., Wang, Y., & Bowman, J. R. (1989). Carbon isotopes in soils and paleosols as ecology and paleoecology indicators. *Nature*, *341*, 138-139.
- Wang, Y., & Zheng, S. H. (1989). Paleosol Nodules as Pleistocene Paleoclimatic indicators, Luochuan, P. R. China. *Palaeogeography, Palaeoclimatology, Palaeoecology*, *76*, 39-44.

# **Invited Book Chapters**

- Wang, Y., Huntington, T., Osher, L., Wassenaar, L., Trumbore, S., Amundson, R., Harden, J., McKnight, R., et. al. (1998). Carbon cycling in the terrestrial environments. In C. Kendall, & J. McDonnell (Eds.), *Isotope Tracers in Catchment Hydrology*. Elsevier Science Publishers.
- Cerling, T. E., & Wang, Y. (1996). Stable carbon and oxygen isotopes in soil CO2 and soil carbonate: theory, practice, and application. In T. W. Boutton, & S. I. Yamasaki (Eds.), *Mass Spectrometry of Soils* (pp. 113-131). Marcel Dekker, Inc., New York.

#### **Refereed Book Chapters**

Wang, Y., Cerling, T. E., Quade, J., Bowman, J. R., Smith, G. A., & Lindsay, E. H. (1993). Stable isotopes of paleosols and fossil teeth as paleoecology and paleoclimate indicators: an example from the St. David Formation, Arizona. In P. K. Swart, K. C. Lohmann, J. McKenzie, & S. Savin (Eds.), *Climate Change in Continental Isotopic Records* (pp. 241-248). American Geophysical Union, Washington DC.

#### **Presentations**

#### **Invited Presentations at Conferences**

- Wang, Y. (presented 2018, July). Clumped isotope thermometry of fossil and modern snail shells from the Himalayan-Tibetan Plateau: implications for paleo-climate and paleo-elevation reconstructions, *The 5th Conference on Earth System Science*, Shanghai, July 2-4, 2018.
- Wang, Y. (presented 2018, June). 喜马拉雅-青藏高原 化石二元同位素(clumped isotope)测温法的分析研究, 地学前沿国际研讨会暨中国地球科学促进会 2018 年会 Frontiers of Earth Sciences Symposium and IPASE Annual Meeting, Qingdao, June 23-26, 2018.
- Wang, Y. (presented 2013, June). *Late Cenozoic environmental change in south-western Tibet: evidence from stable isotopes*. Presentation at First Joint Scientific Meeting of GSC and GSA (Roof of the World), GSA and GSC, Chengdu, China. (International)
- Wang, Y. (presented 2013, July). Isotopic evidence for anthropogenic impacts on aquatic food web dynamics and mercury cycling: A case study from the US. Invited Keynote presentation at *The 1st Freshwater Hydrobiology Symposium*. Fangyu, Guangzhou, China. (International)
- Wang, Y. (presented 2004, June). *Isotopes in fossils and paleosols: records of Cenozoic ecosystem and climate change in northern China*. Presentation at International Symposium on Frontiers of Earth Sciences: Earth, Environment, and Human Impacts, Chengdu Institute of Technology, IPACES, Chengdu, China. (International)
- Wang, Y. (presented 2000, October). Uncertainties and novel prospects in the evaluation of the carbon storage potential of soils. In *International Symposium New Horizons in the Study of the Carbon Cycle*. Rome, Italy. (International)
- Wang, Y. (presented 1992). *Dietary evolution of horses in North America: evidence from carbon isotopes in tooth enamel*. Presentation at Society of Vertebrate Paleontology Annual Meeting, Society of Vertebrate Paleontology, Toronto, Canada. (International)

## **Invited Workshops**

- Wang, Y. (presented 2014, July). Isotopic evidence for anthropogenic impacts on aquatic food web dynamics and mercury cycling in a subtropical wetland ecosystem in the US. In *International Workshop of Computational Geodynamic Frontiers and the IPACES Annual Meeting*. Presentation at the meeting of Key Laboratory of Computational Geodynamics, Chinese Academy of Sciences, Beijing, China. (International)
- Wang, Y. (presented 2009, June). Geographic variations in diets and environments of late Cenozoic herbivores in China: Evidence from stable isotopes. In *Neogene Terrestrial Mammalian Biostratigraphy and Chronology in Asia– A Workshop and Symposium toward the Establishment of a Continent-Wide Stratigraphic and Chronologic Framework*. Presentation at the meeting of IVPP, Chinese Academy of Sciences, Beijing, China. (International)

- Wang, Y. (2012, March). Stable Isotopes, Fossils and late Cenozoic Environmental change in the Tibetan region. Workshop delivered at NSF-NSFC Workshop on Critical Transitions in History of Life, Los Angles, CA. (International)
- Wang, Y. (2011, July). Carbon isotopic evidence for the source and fate of organic matter in the Florida Everglades wetland ecosystems. Workshop delivered at International Workshop on Diversity and Ecology of Freshwater Zooplankton in South East Asia, Gangzhou, China. (International)
- Wang, Y. (2008, June). Stable Isotopic Evidence for a drastic change in habitat and hydrological regime after late Pliocene in Kunlun Pass Basin, Tibetan Plateau. Workshop delivered at Workshop on the evolution of the Asian monsoon system and its impact on Neogene terrestrial ecosystems, Beijing, China. (International)
- Wang, Y. (2007, October). *Stable Isotopes, Fossils and Paleoenvironment*. Workshop delivered at NSF Workshop: Sino-US Collaboration: Critical Transitions in the History of Life, Denver, CO. (International)
- Wang, Y. (2007, February). Stable Isotopes from teeth and bones in the Linxia Basin and other parts of NE Tibet and northeastern China. Workshop delivered at Upward and Outward: NE Tibet Workshop, UC Santa Barbra. (International)
- Wang, Y. (2007, January). *Stable isotopes, mammalian diets and the uplift of the Tibetan Plateau*. Workshop delivered at US-China bilateral workshop on Evolution of Asian Monsoon and Desertification and Growth of the Tibetan Plateau, Sanya, China. (International)
- Wang, Y. (2007, January). *Timing of C4 expansion in northern China: Implications for Asian monsoon evolution and Tibetan uplift*. Workshop delivered at US-China bilateral workshop on Evolution of Asian Monsoon and Desertification and Growth of the Tibetan Plateau, Sanya, China. (International)

## **Invited Lectures and Readings of Original Work**

- Wang, Y. (2016, October). *Tibetan uplift, monsoons and habitat change: Evidence from isotopes in fossil teeth.* Delivered at University of Nebraska, Lincoln. (National)
- Wang, Y. (2016, June). *Tibetan uplift, monsoons and habitat change: Evidence from isotopes in fossil teeth.* Delivered at Institute of Geochemistry, Chinese Academy of Science, Guangzhou, China. (International)
- Wang, Y. (2015, August). *Application of isotope analyses in ecological research*. Delivered at Jinan University, Guangzhou, China. (International)
- Wang, Y. (2015, April). *Tibetan uplift, monsoons and habitat change: Evidence from stable isotopes in fossil teeth.* Delivered at University of California, Los Angeles. (National)

- Wang, Y. (2014, July). *Isotopic evidence for anthropogenic impacts on aquatic food web dynamics and mercury cycling in the Florida Everglades*. Delivered at China University of Geosciences, Beijing, China. (International)
- Wang, Y. (2013, December). Late Cenozoic environmental change in Tibet: Evidence from stable isotopes in fossils. Delivered at Los Angeles County Museum of Natural History, Los Angeles. (National)
- Wang, Y. (2012, August). *Stable isotopes as hydrologic tracers*. Delivered at School of Water Resources and Environment, China University of Geosciences, Beijing. (International)
- Wang, Y. (2011, September). *Tibetan uplift, monsoons and environmental change in China*. Delivered at Bryant University, Smithfield, Rhode Island. (National)
- Wang, Y. (2011, July). Carbon isotopic evidence for the source and fate of organic matter in the Florida Everglades wetland ecosystems. Delivered at Jinan University, Gangzhou, China. (International)
- Wang, Y. (2007). *Isotopes and Archaeology*. Delivered at Department of Anthropology, Florida State University. (Local)
- Wang, Y. (2005, April). *Mammalian diet, climate and tectonic change: isotopic evidence from the N.E. margin of the Tibetan Plateau*. Delivered at Carleton College, Northfield, Minnesota. (National)
- Wang, Y. (2004, September). A 25 m.y. isotopic record of paleodiet and environmental change from fossil mammals and paleosols from the NE margin of the Tibetan Plateau. Delivered at University of Florida, Gainesville. (Regional)
- Wang, Y. (2004, July). *Isotopes in fossils and paleosols: records of Cenozoic ecosystem and climate change in northern China*. Delivered at Yunnan Institute of Relics and Archaeology, Kunming, China. (International)
- Wang, Y. (2002, March). Late Cenozoic vegetation and climate change recorded in mammalian tooth enamel. Delivered at Ohio State University. (National)
- Wang, Y. (2002, March). *Isotopic evidence for the source and fate of dissolved organic matter in the Florida Everglades*. Delivered at Ohio State University. (National)
- Wang, Y. (2002, March). Late Cenozoic vegetation and climate change recorded in mammalian tooth enamel. Delivered at University of Florida, Gainesville. (Regional)
- Wang, Y. (2001, May). Late Cenozoic paleoenvironmental changes in Northern China: Evidence from carbon and oxygen isotopes in fossil tooth enamel. Delivered at Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences, Beijing. (International)
- Wang, Y. (2001, May). Late Cenozoic paleoenvironmental changes in Northern China: Evidence from carbon and oxygen isotopes in fossil tooth enamel. Delivered at Institute of Geology and

- Geophysics, Chinese Academy of Sciences, Beijing. (International)
- Wang, Y. (1997, April). *Carbon and Oxygen isotopes as environmental indicators*. Delivered at Georgia Institute of Technology. (National)
- Wang, Y. (1997, February). *Stable isotopes as environmental indicators*. Delivered at Auburn University. (National)

#### **Contracts and Grants**

#### **Contracts and Grants Funded**

- Wang, Yang (PI). (Apr 2016–Mar 2019). *Collaborative Research: Reconstruction Of Paleo-Storm History Using Geochemical Proxies In Coastal Lake Sediments*. Funded by National Science Foundation. (1566134). Total award \$292,410.
- Wang, Yang (PI). (May 2014–Aug 2014). COFRS: Clumped Isotopes in Freshwater Radix Snails in Tibet and Surrounding Regions: Implications for Reconstructing Paleo-Temperatures. Funded by FSU CRC. Total award \$14,000.
- Wang, Y. (PI). (May 2010–Apr 2014). Collaborative Research: Late Cenozoic Vertebrate Paleontology and Paleoenvironments of the Tibetan Plateau (China). Funded by NSF. (EAR-0958602). Total award \$107,000.
- Wang, Yang (PI), Wise, S. W., & Chanton, J. P. (Apr 2009–Mar 2011). *Technician Support for the Stable Isotope Laboratory*. Funded by National Science Foundation. (0824628). Total award \$89,545.
- Donoghue, Joseph F (PI), Kish, Stephen A (Co-PI), Elsner, James B (Co-PI), Wang, Yang (Co-PI), Hu, Xiaolong (Co-PI), & Ye, Ming (Co-PI). (Feb 2009–Mar 2013). *Effects of Near-Term Sea-Level Rise on Coastal Inrastructure*. Funded by United States Army Humphreys Engineer. (W912HQ-09-C-0010). Total award \$1,029,366.
- Wang, Yang (PI). (Mar 2008–Dec 2008). *Biogeochemical Analyses of Organic Samples*. Funded by South Florida Water Management. (4500022658). Total award \$49,500.
- Wang, Yang (PI). (Jan 2008–Dec 2010). Collaborative Research: The Impact of Late Cenozoic Himalayan-Tibetan Uplift on C4 Plant Expansion, Climate and Mammalian Evolution in Northern China. Funded by National Science Foundation. (0716235). Total award \$50,231.
- Wise, Sherwood (Co-PI), Chanton, Jeffrey (Co-PI), & Wang, Yang (PI). (Dec 2005–Mar 2009). *Technician Support for the Stable Isotope Laboratory at Florida State University - Phase I*. Funded by National Science Foundation. (0517806). Total award \$215,791.
- Wang, Yang (PI). (Jul 2005–Oct 2005). Determination of the Oxygen Isotopic Composition of Phosphate in Sediment and Water in the Stormwater Treatment Area 1 West, South Florida. Funded by

- South Florida Water Management. (PC P502588). Total award \$27,983.
- Wang, Yang (PI). (Mar 2005–Feb 2009). Collaborative Research: Vertebrate Paleontology and Paleoenvironments of the Richest, Endemic-Dominated Fossil Assemblage in Cenozoic of Tibetan Plateau (Qaidam Basin, China). Funded by National Science Foundation. (0444073). Total award \$80,408.
- Wang, Yang (PI). (Apr 2004–May 2005). *Study of Oxygen Isotopic Composition of Phosphate in STA- 1W*. Funded by South Florida Water Management. (PC P401443). Total award \$49,976.
- Wang, Y.(PI), Chanton, J., Wise, S., & Salters, V. (Jul 2003–Jun 2005). *Acquisition of a stable isotope ratio mass spectrometer*. Funded by NSF. (EAR-0236357). Total award \$215,112.
- Wang, Y. (Jul 2002–Dec 2005). *Isotopic evidence for late Cenozoic climate and ecosystem changes in China*. Funded by NSF. (INT-0204923). Total award \$153,833.
- Furbish, D.(PI), & Wang, Y. (Sep 2001–Mar 2003). *Biocomplexity Incubation: An integrated Approach Towards a Quantitative Model of Salt Marsh Biocomplexity and Morphodynamics*. Funded by NSF. Total award \$67,245.
- Wang, Y. (Nov 2000–Oct 2001). *Isotopic Evidence for Late Cenozoic Ecosystem and Climate Changes in Southwest China*. Funded by NSF. (INT-0002649). Total award \$19,613.
- Wang, Y. (Aug 2000–Jul 2002). *Tracing the source of phosphorus using oxygen isotopic ratios*. Funded by NSF. (EAR-0073851). Total award \$61,993.
- Chanton, J.(PI), & Wang, Y. (Jul 2000–Jun 2001). *Isotopic Studies at Ameriflux Tower Sites: Estimating CO2 Exchange and Anthropogenic CH.* Funded by NIGEC. (1368-787-41). Total award \$86,577.
- Salters, V.(PI), Cooper, W., Hsieh, Y. P., Landing, W., Marshall, A., Proctor, L., & Wang, Y. (Sep 1997–Mar 1999). *The Speciation and Sources of Dissolved Phosphorus in the Everglades*. Funded by SFWMD. (502456839). Total award \$185,000.
- Wang, Y. (Sep 1997–Aug 2000). Coastal Wetland Formation and Its Significance to Carbon Sequestration. Funded by DOD. (1323-623 -41). Total award \$50,291.

#### **Contracts and Grants Pending**

Wang, Yang (PI). (Dec 2017). : Collaborative Research: Gateway to North America – the Great American Biotic Interchange (GABI) in Mexico and Origin of C4 Grassland. Submitted to NSF.

#### Service

## Florida State University

# **University Service**

Senator, Faculty Senate (2016–present).

Committee member, WIMSE Faculty Advisory Committee (1997-present).

Senator, Faculty Senate (2006–2010).

Panel member, Academic Honor Policy Hearing panel (2009).

Reviewer, Ad hoc RCR committee (2009).

Member, CRC COFRS Committee (1999).

# **Department Service**

Member, Geology Graduate Student Award Committee (2014–present).

Member, Curriculum Committee (2008–present).

Chair, Faculty evaluation committee (geology curriculum group) (2017).

Member, Faculty evaluation committee (geology curriculum group) (2014–2016).

Member, Admissions Committee (2013–2016).

Member, Faculty Search Committee (2013–2014).

Member, Peer Teaching Evaluation Committee (2013).

Member, Peer Teaching Evaluation Committee (2005–2006).

Member, Graduate Program Committee (1997–2002).

Member, Admissions Committee (1996–2002).

Member, Faculty Search Committee (1999).

#### The Profession

#### **Editor for Refereed Journals**

Associate Editor, Science Bulletin (2014–2018).

Associate Editor, SCIENCE CHINA Earth Sciences (2012–2018).

Associate Editor, Chinese Science Bulletin (2008–2014).

# **Editorial Board Membership(s)**

Global and Planetary Change (2014–present).

Quaternary Sciences (2017-present).

Science Bulletin (2014–2018).

SCIENCE CHINA Earth Sciences (2012–2018).

Chinese Science Bulletin (2008–2014).

全球变化研究评论 (2009-2012).

#### **Guest Reviewer for Refereed Journals**

Environmental Science & Technology

GSA Bulletin

Quaternary Science Review

Earth and Planetary Science Letters

Palaeogeography, Palaeoclimatology, Palaeoecology

Global and Planetary Change

Journal of Paleolimnology

Quaternary International

Radiocarbon

Journal of Asian Earth Sciences

Science

Applied Geochemistry

Rapid Communication in Mass Spectrometry

Geochimica et Cosmochimica Acta

Quaternary Research

Global Biogeochemical Cycles

Proceedings of the Ocean Drilling Program

Journal of AOAC international

Canadian Journal of Earth Sciences

Global Change Biology

**Biogeochemistry** 

## **Reviewer or Panelist for Grant Applications**

Reviewer for National Science Foundation (1998–present).

Panelist, National Science Foundation (2017).

Panelist, National Science Foundation (2014).

Committee of Visitors, National Science Foundation (2013).

Panelist, National Science Foundation (2009).

Panelist, National Science Foundation (2003–2006).

Reviewer, Petroleum Research Fund (American Chemical Society) (2002).

Reviewer, USDA-Managed Ecosystem Research Program (2001–2002).

Reviewer, Institute of Geophysics and Planetary Physics (LLNL/UC) (1996–1997).

Reviewer, National Environment Research Council (United Kingdom) (1996).