

## Curriculum vitae- Ryan Mathur

### Education:

Juniata College (1992-1996) B.A., Magna cum Laude, in Geology/ History  
Language School, Cuernavaca, Mexico (summer 1995)  
Albion College (summer 1996) Field Camp  
University of Arizona (1997- 2000) Ph.D. Thesis title: *Re-Os Isotopes of Base Metal  
Porphyry Deposits*. Dec. 2000, Advisor: Dr. Joaquin Ruiz

### Professional Experience:

#### *Teaching:*

Professor (2013-now), Associate Professor (2007- 2012), Assistant Professor (2001-  
2007) Juniata College teaching Structural Geology, Introduction to Geology, Introduction to Earth and  
Environmental Science, Hydrogeology, Geophysics, Mining in the Americas, Scanning Electron  
Microscopy, Field Methods 1, Field Methods 2, Geology Professional Seminar, Geological Research  
Methods, Death and Destruction by Nature, Remote Field Course, Environmental Geochemistry and the  
labs.

Department chair of Geology program at Juniata College (2012 spring-now)

Teaching assistant University of Arizona (2000): taught classes in Chemical Evolution of the  
Earth and Introduction to Geochemistry.

Teaching assistant University of Arizona (1998): instructed lab sessions in Introduction to  
Physical Geology class, and assisted in Introduction to Geochemistry.

Teaching assistant Juniata College (1994-96): helped students with lab exercises in lab and field  
for Introduction to Geology, Mineralogy, Petrography, and Structural Geology.

#### *Research:*

Research Associate, Carnegie Museum of Natural History (spring 2003-current)- assist in  
identification of unknown mineral species with Marc Wilson

Research Associate, Penn State (summer 2002-current)- work with S. Brantley on copper, iron,  
and molybdenum stable isotope geochemistry, work on MC ICPMS with J. Vervoort (WSU), Ian Ridley  
and Richard Wanty (USGS), A. Anbar (ASU), and J. Ruiz (UA); Collaborator and part of Center for  
Environmental and Kinetic Analysis (CEKA); worked with D. Gold and A. Doden on geologic  
characterization of the Skytop outcrop

Research Associate, University of Texas (summer 2009-current)- work with M. Cloos on Cu  
isotope stable isotope geochemistry and Re-Os dating of molybdenite

Research Associate, Rutgers University (fall 2015-current)- work with L. Godfrey with Mo isotope  
fractionation in solutions, Cu isotopes in artifacts and ores.

Contracted Ore deposit Research (summer 2001 to current)-

ACADEMIC- S. Brantley (PSU, State College, PA), D. Gold (PSU, State College, PA), J. Munha  
(Lisbon, Portugal), F. Munizaga, V. Makseav (Un. De Chile; Santiago, Chile), T. Seifert (Frieburg,  
Germany), F. Tornos (Salamanca, Spain), W. Cotton (Boulder, Colorado), N. Taghipour (Kerman, Iran), P.  
Spry (ISU; Ames, Iowa), B. Scheetz (PSU; State College, PA), G. Borg (Un. of Halle Wittenburg,

Germany), R. Marschik (Un. Muenchen, Germany), O.F. Celik (University of Izmit-Kocaeli/Turkey), H. Mirnejad (University of Tehran, Iran), D. Guido (Instituto de Recursos Minerales, Argentina), K. Deckart, M. Reich and B. Townley (Un. De Chile; Santiago, Chile), M. Cloos (University of Texas, Texas), A. Conly (Lakehead University, Canada), M. Ghaderi (Tarbiat Modares University, Iran), B. Shafiei (Golestan University Iran), E. van Hees (Wayne State, Michigan), A. Dodson, L. Munk (University of Alaska, Alaska), K. Hickey (University of British Columbia, Canada), M. Zentilli (Dalhousie University, Canada), J. Saunders (Auburn University, Alabama), C. Gauert (Free State University, South Africa), K. Kouzmanov (University of Geneva, Switzerland), L. Jin (UTEP, Texas), J. Hassanzadeh (Cal Tech, California), J. Mortensen (University of British Columbia, Canada), W. Powell (CUNY, NYC), C. Bridge (University of Tulsa, Oklahoma), E. Turner (Laurentian University, Canada), A. Ucurum (Cumhuriyet Universitesi, Turkey), E. Campos (Universidad Católica del Norte, Chile), L. Godfrey, (Rutgers, NJ), M. Brueseke, P. Kempton (Kansas State University, Kansas), J. Rakovan, M. Kreker (University of Miami, Ohio), T. Bornhorst (Michigan Tech University), J. Post (Smithsonian Museum of Natural History, Washington, D.C.), Shao-Yong Jiang (Nanjing University, China), V. Debialle (University of Brussels, Belgium)

INDUSTRY- M. Wilson (Carnegie Museum of Natural History, PA), R. Smith and G. Blackmer (Pennsylvania Survey), R. Stegen (Phelps Dodge; Tucson, Arizona), M. Casselman and P. Megaw (Candente Resources; Vancouver, Canada), A. Doden (GRME, Pennsylvania), D. Braxton, A. Wilson., M. Cruz, J. Ortuzar (Anglo America, Australia), P. Linton, R. Shaw, R. Padilla, M. Doyle (Anglo Ashanti Gold), P. Pollard (consultant, Australia), J. Macpherson and C. Leys (Freeport, Indonesia), G. Herman, R. Volkert (New Jersey Survey), A. Brown (Newmont, Nevada), V. Valencia (consultant, Arizona), W. J. Schlitt (Hydromet, California), H. Falck (Canada Geologic Survey), J. Lang (Hunter Dickinson, Vancouver, Canada), J. Porter, K. Schroder, R. Franklin, R. Kehayov (Rio Tinto, Utah), H. Martin (Rio Tinto, Arizona), T. Gray (Rio Tinto, China), G. Corlett, (Ivanhoe, Australia), B. Ganis (consultant, North Carolina), P. St. George, M. Schaefer (Millrock./ Geo. Infor. Solutions, Arizona), D. Murphy (Yukon Geologic Survey, Canada), G. Gastelum (Fresnillo, Mexico), N. Petrov (Quantum Minerals, Mauritania), J. Renkowski, A. Stoltze, J. Kidder (Quantum minerals, Australia), K. Armstrong (Strongbow, Canada), Y. Junming (Chinese Academy of Sciences, Guangzhou Institute of Geochemistry), N.M. Inca and T. Simpson (Newmont, Peru), R. Lujan (Newmont, Nevada), Drs. Song, Su and Gou, Jingwen, Su (Chinese Geological Survey, Nanjing), Dr. Deng (Chinese Geological Survey, Beijing), C. Santana (BHP, Escondida, Chile),

Post-Doc (2001 spring, summer): continued research of ore deposits using Re-Os isotopes and exploratory studies using stable copper isotopes

Research assistant University of Arizona (1998-2000): conducted Re-Os work on ore deposits, funded by NSF, Broken Hill Mining Projects (BHP), and Freeport Mc Mo ran.

National Association of Geology Teachers (NAGT) appointee for USGS (summer 1997): worked on paleoseismic study examining ancient tectonically liquefied river sediments with Dr. Steve Obermeir.

Carnegie Museum of Natural History, Hillman Hall of Minerals Intern (spring 1996): organized and identified rock collection with Marc Wilson.

Research assistant Juniata College (Fall 1996): identified and sorted conodonts from local bed rock for Dr. Keith Mann.

#### *Grant Awards:*

Co-PI on 2009 MRI: Acquisition of a Multiple Collector Inductively-Coupled Mass Spectrometer (MC-ICP-MS) for Multi-Disciplinary Biogeochemical Research at Penn State (\$724,002)

PI on research grant from PA DCNR. 2009 Geochronology of sulfides and zircons in PA (\$5,000)

Co-PI research grant from MAUTC Investigation of sulfide age dates in Pennsylvania. 2008 (\$40,000)

ACS research fellow for Re-Os study of sulfides in the Cretaceous Western Interior Basin. 2008 (\$7,000)

PI on research grant from PA DCNR. 2008 Geochronology of sulfides in PA (\$3,000)

Travel grant NSF 2008 to attend Gordon Research conference (\$2,200)

PI on research grant from Goodman funds from Juniata College. 2008 Cu isotope study of Silver Bell Porphyry copper deposit, AZ (\$5,000)

PI on research grant from PA DCNR. 2007 Geochronology of sulfides in PA (\$6,800)

PI on research grant from Phelps Dodge. 2006 Cu isotope study on Morenci Porphyry copper deposit, AZ (\$10,000)

PI on research grant from Doubloon Exploration Corp. 2005 for mapping epithermal Au system in the Ganarin District, Ecuador (\$10,000)

PI on research grant Pennsylvania Geologic Survey. 2005 Molybdenite study of Antietam Res. (\$2000)

PI on research grant from Penndot. 2005 Age and Nature Study of Acid-Generating Mineralization Along Segments of I-99 on Bald Eagle Ridge". (\$16,000)

Co-PI on 2004 Growing Greener, Pa DEP: "Nutrient study of Warriors Mark Branch to Spruce Creek " (\$15,000)

Research grant from Travel Grant from FONDECYT 2004 for Chilean Cretaceous Porphyry Copper research (\$2,000)

Travel Grant from NSF 2004 El Laco Fe ore research (\$1,500)

Co-PI on 2004 PA Water Resources Research Center base grant program: "Controls on Nutrient Levels for Spruce Creek and a Major Tributary" (\$15,000)

Co-PI on 2003 MRI grant for Scanning Electron Microscope (\$300,000)

### **Honors and Awards:**

Honorary Award, American Federation of Mineral Society, Eastern Division (2014)

First place prize in Graduate Student Showcase, University of Arizona (2000)

Tucson Gem & Mineral Society Scholarship (1997, 1999)

Sulzer Earth Science Scholarship, University of Arizona (1997, 1998)

Honorable mention for Fulbright Graduate Student Fellowship, University of Arizona (1998)

Honorable mention for National Science Foundation Graduate Student Fellowship (1997)

Economic Geology Scholarship, University of Arizona (1997)

Bowser Mathematics and Geology Award, Juniata College (1996)

Deans List, Juniata College (1994-1996)

National Honor Society, Juniata College (1995-1996)

## Peer Reviewed Journal Articles:

77. Mathur, R. and Wang, D. (accepted) Transition metal isotopes applied to exploration geochemistry: insights from Fe, Cu and Zn. Chapter in: Ore Deposits: Origin, Exploration and Exploitation. Eds Robb, L. and Decree, S., Wiley.
76. Powell, W., Mathur, R., Bankoff, H.A., Mason, A., Bulatovic, A., Filipovic, V., Godfrey, L., (2018) Copper Isotopes as a Means of Determining Regional Metallurgical Practices in European Prehistory: A Reply to Jansen Journal of Archeological Science. v. 89.
75. Mathur, R., Arribas, A., Megaw, P., Wilson, M., Stroup, S., Meyer-Arrivillaga, Arribas, I. (2018) Fractionation of silver isotopes in native silver explained by redox reactions. Geochimica et Cosmochimica Acta. v 224, 313-326.
74. Wang, D., Zheng, Y., Mathur, R., Wu, S. (2018) The Fe–Zn isotopic characteristics and fractionation models: Implications for the genesis of the Zhaxikang Sb–Pb–Zn–Ag deposit in Southern Tibet. Geofluids
73. Mathur, R., Falck, H., Belogub, E., Milton, J., Wilson, M., Rose, A., Powell, W. (2018) Origins of chalcocite defined by copper isotope values. Geofluids, Article ID 5854829, 9 pages.
72. Celik, O., Marzoli, A., Marschik, R., Chiaradia, M., Mathur, R. (2018) Geochemical, mineralogical and Re-Os isotopic constraints on the origin of Tethyan oceanic mantle and crustal rocks from the Central Pontides, northern Turkey. Mineralogy and Petrology v. 112, 25-44.
71. Powell, W., Bankoff, A.H., Mason, A., Mathur, R., Bulatović, A., Filipović, V. (2017) Tin Sources and Regional Trade in the Bronze Age of Southeast Europe: Evidence from Tin Isotopes. In Popov, H. and Aleksandrov, S (eds.) Gold and Bronze. Metals, Technologies and Networks in the Eastern Balkans during the Bronze Age. National Archaeological Institute, Bulgarian Academy of Sciences.
70. Zhi-Yong, Z., Jiang, S.-Y., Mathur, R., Cook, N., Yang, T., Wang, M., Ma, L., Ciobanu, C. L. (2018) Iron isotope behavior during fluid/rock interaction in K-feldspar alteration zone – a model for pyrite in gold deposits from the Jiaodong Peninsula, East China. Geochimica et Cosmochimica Acta, v. 222, 94-116.
69. Gregory, M. and Mathur, R. (2017) Understanding copper isotope behavior in the high temperature magmatic-hydrothermal porphyry environment. G-cubed (Geochemistry, Geophysics, Geosystems), v.18, 4000-4015.
68. Bornhorst, T. and Mathur, R. (2017) Copper Isotope Constraints on the Genesis of the Keweenaw Peninsula Native Copper District, Michigan, U.S.A. Minerals, v.7, 185-205.
67. Powell, W., Mathur, R., Bankoff, H.A., Mason, A., Bulatovic, A., Filipovic, V., Godfrey, L., (2017) Digging deeper: Insights into metallurgical transitions in European prehistory through copper isotopes. Journal of Archeological Science. v. 88, 37-46.
66. Jin, L., Ma, L., Deree, A. White, T., Mathur, R., Brantley, S. (2017) REE mobility and fractionation during shale weathering along a climate gradient. Chemical Geology v. 466, 352-379.
65. Mathur, R., Powell, W., Mason, A., Godfrey, L., Yao, J., Baker, M. E., (2017) Preparation and measurement of cassiterite for Sn isotope analysis. Geostandards and Geoanalytical Research.v.41,issue 4, 701-707.
64. Simmons, V., Moazzen, M., Mathur, R. (2017) Constraining the timing of porphyry mineralization in northwest Iran in relation to Lesser Caucasus and Central Iran; Re–Os age data for Sungun porphyry Cu–Mo deposit. International Geology Reviews, v. 59, 1561-1574.
63. Pollard, P., Pelen, Kova, E., Mathur, R. (2017) Paragenesis and Re-Os molybdenite age of the Cambrian Ak-Sug porphyry Cu-Au-Mo deposit, Tyva Republic, Russian Federation. Economic Geology. v. 112, 1021-1028.

62. Cao, M., Yao, J., Deng, X., Yang, F., Mao, G., *Mathur, R.* (2017) Diverse and multistage Mo, Au, Ag–Pb–Zn and Cu deposits in the Xiong'er Terrane, East Qinling: From Triassic Cu mineralization. *Ore Geology Reviews* v.81, 565-574.
61. Yao, J., *Mathur, R.*, Sun, W., Song, W., Chen, H., Mutti, L., Xiang, X., Luo, X. (2016) Fractionation of Cu and Mo isotopes caused by vapor-liquid partitioning, evidence from the Dahutang W-Cu-Mo deposit. *G-cubed (Geochemistry, Geophysics, Geosystems)*, v.17, 1725-1739.
60. Mason, A.H., Powell, W.G., Bankoff, H.A., *Mathur, R.*, Bulatović, A., Filipović, V., Ruiz, J. (2016) Tin Isotope Characterization of Bronze Artifacts of the Central Balkans. *Journal of Archeological Science*, v. 69, 110-117.
59. Burns, J. A., Dudash, A., *Mathur, R.* (2016) Fort Shirley's Copper Charm: Investigating Muslim Ethnicity on Pennsylvania's Colonial Frontier. *Pennsylvania Magazine of History and Bibliography*, vol 140, No. 3, 413-416.
58. Song, S., *Mathur, R.*, Ruiz, J., Chen, D., Allin, N., Guo, K., Kang, W. (2016) Fingerprinting two metal contaminants in streams with Cu isotopes near the Dexing Mine, China. *Science of the Total Environment*, v. 544, 677-685.
57. Saunders, J., *Mathur, R.*, Kamenov, G., Shimizu, T., Brueseke, M. (2016) New isotopic evidence bearing on Bonanza (Ag-Au) epithermal ore forming process. *Mineralium Deposita*, v. 51, 1-11.
56. Wilson, M., Wilson, D., *Mathur, R.* (2016) Tracing the source of native copper mineral specimens with copper isotope values; a case study showing the misidentification of CM21474. *Rocks and Minerals*, July/August v. 91 no. 4, 352-356.
54. *Mathur, R.* and Fantle, M. (2015) Copper isotopic perspectives on supergene process: Implications of for the Global copper cycle. *Elements*. V. 11, 323-329.
53. Bristol S. K., Spry, P.G., Voudouris, P. Ch., Melfos, V., *Mathur, R. D.*, Fornadel, A. P., Sakellaris, G-A. (2015) Geochemical and geochronological constraints on the formation of shear-zone hosted Cu-Au-Bi-Te mineralization in the Stanos district, Chalkidiki, northern Greece. *Ore Geology Reviews*, v.66, 266-282.
52. Asadi, S., *Mathur, R.*, Moore, F., Zarasvandi, A. (2015) Cu isotope fractionation in the Meiduk porphyry copper deposit, Northwest of Kerman Cenozoic magmatic arc, Iran. *Terra Nova*, v.27, 36-41.
51. Doyle, M. G., Fletcher, I. R., Foster, J., Large, R. R., *Mathur, R.*, McNaughton, N. J., Meffre, S., Muhling, J. R., Rasmussen, B. (2015) Geochronological constraints on the Tropicana Gold Deposit and Albany Fraser Orogen, Western Australia. *Economic Geology*, v.110, 355-386.
50. Shafiei, B. Shamanian, G. H., *Mathur, R.* (2015) Mo isotope fractionation during hydrothermal evolution of porphyry Cu systems. *Mineralium Deposita*, v.50, 281-291.
49. *Mathur, R.*, Munk, L.A., Townley, B., Gou, K. Y., Gómez Miguélez, N., Titley, S. R., Chen, G. G., Song, S., Reich, M., Tornos, F., Ruiz, J. (2014) Tracing low-temperature aqueous metal migration in mineralized watersheds with Cu isotope fractionation. *Applied Geochemistry* v. 51, 109-115.
48. *Mathur, R.* Wilson, M., Parra, K. (2014) Challenges in using Cu isotope compositions to trace source of metal in Cu artifacts: example from Keweenaw, Michigan. *Annals of Carnegie Museum*, v. 82 no.3, 269-273.
47. Fornadel, A., Spry, P., *Mathur, R.*, Jackson, S., Chapman, J., Girard, I. (2014) Methods for the determination of Te isotopes of minerals in the system Au-Ag-Te by MC-ICP-MS. *J of Analytical Atomic Spectrometry*.
46. Spry, P., *Mathur, R.*, Bonsall, T. A., Voudouris, P. Ch., Melfos, V. (2013) Re-Os isotope evidence for mixed source components in carbonate-replacement Pb-Zn-Ag deposits in the Lavrion district, Attica, Greece. *Mineralogy and Petrology*. V. 10, 1-11.

45. Jin, L., *Mathur, R.*, Rother, G., Cole, D., Bazilevskaya, E., Williams, J. Carone, A., Brantley, S. (2013) Evolution of porosity and geochemistry of Marcellus Formation black shale during weathering. Chemical Geology, v.356, 50-63.
44. LaliFaz, S., Shafiei, B., Shamanian, GH.H., Taghizadeh, H., Hossaini, M., *Mathur, R.* (2013) Rhenium distribution and its controlling factors in molybdenite types of Kerman porphyry copper deposits. *Geosciences*, 86 no. 22, 143-153.
43. *Mathur, R.*, Gauert, C., Ruiz, J., Linton, P. (2013) Evidence for mixing of Re-Os isotopes at <2.7 Ga and support of a remobilized placer model in Witwatersrand sulfides and native Au. Lithos. v. 164-167, 65-73.
42. Mirenjad, H., *Mathur, R.*, Shafie, B., Hassanzadeh, J., Nourali, S. (2013) Re-Os dating of molybdenites, U-Pb age determination of zircons and sulfur isotope compositions of sulfides (pyrite and chalcopyrite) from Iju and Sarkuh porphyry copper deposits in Kerman Cu belt, Iran: Linking Cu mineralization to the host porphyry emplacement. Economic Geology, v. 108 no. 4 861-870.
41. *Mathur, R.*, Munk, L., Nguyen, M., Gregory, M., Annel, H., Lang, J., (2013) Modern and paleo fluid pathways revealed by Cu isotope fractionation in surface waters and ores of the Pebble porphyry Cu-Au-Mo deposit, Alaska. Economic Geology, v.108 529-541.
40. *Mathur, R.* and Mortensen, J. (2012) Re-Os dating of gold in gold-bearing orogenic vein systems in the Klondike district - progress report. Yukon Exploration & Geology, 65-73.
39. *Mathur, R.*, Ruiz, J., Casselman, M.J., Megaw, P., van Egmond, R., (2012) Use of Cu isotopes to distinguish primary and secondary Cu mineralization in the Cañariaco porphyry copper deposit, northern Peru. Mineralium Deposita, v. 47, 755-762.
38. Yesavage, T., Fantle, M. S., Vervoort, J., *Mathur, R.*, Jin, L., Liermann, L.J., Brantley, S. L. (2012) Fe cycling in the Shale Hills Critical Zone Observatory Pennsylvania: An analysis of biogeochemical weathering of Fe isotope fractionation. Geochimica et Cosmochimica Acta, v.99, 18-38.
37. *Mathur, R.*, Jin, L., Paul, J., Prush, V., Ebersole, C., Williams, J., Brantley, S., (2012) Insights into the weathering processes of black shale through Cu Isotopes and Concentrations of the Marcellus Formation shale, Pennsylvania. Chemical Geology, v. 304-305, 175-184.
36. *Mathur, R.*, Titley, S., Schlitt, W. J., Wilson, M. (2012) Cu isotope fractionation in exploration geology and hydrometallurgy: examples from porphyry copper deposits. Mining Engineering, v. 64, 48-52.
35. Wall, A.J., *Mathur, R.*, Post, J.E., Heaney, P.J., (2011) Cu isotope fractionation during bornite dissolution: An in situ X-ray diffraction analysis. Ore Geology Reviews, v.42, 62-70.
34. Braxton, D. and *Mathur, R.* (2011) Exploration Applications of Copper Isotopes in the Supergene Environment: A Case Study of the Bayugo Porphyry copper-gold Deposit, Southern Philippines. Economic Geology, v.106, 1447-1463.
33. Wall, A., Heaney, P., *Mathur, R.*, Post, J., Hanson, J., Eng, P. (2011) A flow-through reaction cell that couples time resolved X-ray diffraction with stable isotope analysis. Journal of Applied Crystallography, v. 44, 429-432.
32. Liermann, L.,J., *Mathur, R.*, Wasylenki, L. E., Nuester, J., Anbar, A., D., Brantley, S.,L. (2011) Element release and metal isotope fractionation from two central Pennsylvania shales in the presence of organic ligands and bacteria. Chemical Geology 281. 167-180.
31. Doden, Arnold G., Gold, David P., *Mathur, R.*, and Jensen, Luke A., (2010) Bedrock Geology of the State College Quadrangle, Centre County, Pennsylvania. Pennsylvania Geological Survey, 4th ser., Open-File Report.

30. Mathur, R., Dendas, M., Titley, S., Phillips, A. (2010) Patterns in the copper isotopic composition of minerals in porphyry copper deposits in the Southwestern United States of America. Economic Geology, 105, 1457-1467.
29. Mathur, R. and Schlitt, W. J. (2010) Identification of the dominant Cu ore minerals providing soluble copper at Cañariaco, Peru through Cu isotope analyses of batch leach experiments. Hydrometallurgy v. 101, 15-19.
28. Mirenjad, H., Mathur, R., Einali, M., Dendas, M., Alirezaei, S., (2010) A comparative Cu isotope study of porphyry copper deposits in Iran. Geochemistry: Exploration, Environment, Analysis v.10, 413-418.
27. Mathur, R., Brantley, S., Anbar, A., Munizaga, F., Makseav, V. Newberry, R., Vervoort, J., Hart, G. (2010) Variation of Mo isotopes from molybdenite in high temperature hydrothermal ore deposits. Mineralium Deposita v.45, 43-50.
26. Buss, H., Mathur, R., White, A.F., Brantley, S.L. (2010) Phosphorus and iron cycling in deep saprolite, Luquillo Mountains, Puerto Rico. Chemical Geology v. 269, 52-61.
25. Mathur, R., Titley, S., Barra, F., Brantley, S., Wilson, M., Phillips, A., Munizaga, F., Makseav, V., Vervoort, J., Hart, G. (2009) Cu isotope fractionation used to identify supergene processes. SEG special publication 14, chpt 4, 45-59.
24. Kimball, B., Mathur, R., Dohnalkova, A., Wall, A., Brantley, S. (2009) Copper isotope fractionation in acid mine drainage. Geochimica et Cosmochimica Acta v.73, 1247-1263.
23. Mathur, R., Titley, S., Barra, F., Brantley, S., Wilson, M., Phillips, A., Munizaga, F., Makseav, V., Vervoort, J., Hart, G. (2009) Exploration potential of Cu isotope fractionation in Porphyry Copper deposits. Journal of Geochemical Exploration, v.102, 1-6.
22. Mathur, R., Titley, S., Hart, G., Wilson, M., Zlatos, C., (2009) The history of the United States Cent revealed through copper isotope fractionation. Journal of Archeological Science, v.36, 430-433.
21. Mathur, R., Tornos, F., Ruiz, J., Barra, F. (2008) The Aguablanca Ni-Cu deposit: A Re-Os Isotope Study. International Geology Reviews. v.50, p. 948-958.
20. Jang, J-J., Mathur, R., Liermann, L., Ruebush, S., Brantley, S. (2008) An iron isotope signature related to electron transfer between aqueous ferrous iron and goethite. Chemical Geology, v. 250, 40-48.
19. Taghipour, N., Aftabi, A., Mathur, R. (2008) Geology and Re-Os Geochronology of Mineralization of the Miduk Porphyry Copper Deposit, Iran. Resource Geology, v. 58, No. 2, 1 – 18.
18. Mathur, R., Mutti, L., Barra, F., Gold, D., Smith, R. C., Doden, A., Detrie, T., Mc Williams, A. (2008) Fluid inclusion and Re-Os isotopic evidence for hot, Cenozoic mineralization in the central Pennsylvanian Valley and Ridge Province. Mineralogy and Petrology v. 93, 309-324.
17. Wasylenki, L. E., Anbar, A. D., Liermann, L. J., Mathur, R., Gordon, G. W., Brantley, S. L. (2007) Isotope fractionation during microbial metal uptake using MC-ICP-MS. Journal of Analytical Atomic Spectroscopy, v. 22, 1-6.
16. Diesel, E.A. Wilson, M. L., Mathur, R., Teeters, E., Lehmann, D., Zlatos, C. (2007) Nutrient Loading Patterns on an Agriculturally Impacted Stream System over Three Summers. Northeastern Geology and Environmental Sciences, v.29, n. 1, 25-33.
15. Mathur, R., Ruiz, J., Titley, S., Buss, Heather, Liermann, L., Brantley, S. (2005) Cu isotope fractionation in the supergene with and without bacteria. Geochimica et Cosmochimica Acta v 69 n 22, 5233-5246.

14. Marshik, R., *Mathur, R.*, Ruiz, J., Leville, R., de Almeida, A.J. (2005) Late Archean Cu-Au-Mo mineralization at Gameleira and Serra Verde, Carajás Mineral Province, Brazil: Constraints from Re-Os molybdenite ages. *Mineralium Deposita* v. 39, 983-991.
13. *Mathur, R.*, Titley, S., Ruiz, J., Gibbins, S., Frieauf, K. (2005) A Re-Os isotope study of sedimentary rocks and copper-gold ores from the Ertsberg District, West Papua, Indonesia. *Ore Geology Reviews* v. 26 207-226.
12. Masterman, G. J., Cook, D. R., Berry R. F., Clark, A. H., Archibald, D. A., *Mathur, R.*, Walshe, J. L., Durán M. (2004)<sup>40</sup>Ar-<sup>39</sup>Ar and Re-Os Geochronology of Porphyry Copper-Molybdenum Deposits and Related Copper-Silver Veins in the Collahuasi District, Northern Chile. *Economic Geology* v. 99, no. 4, 673-690.
11. MaksaeV, V., Munizaga, F., McWilliams, M., *Mathur, R.*, Ruiz, J., Fanning, M. (2004) New Chronology for El Teniente, Chilean Andes, from U-Pb, <sup>40</sup>Ar/<sup>39</sup>Ar, Re-Os, and Fission-Track Dating: Implications for the Evolution of a Supergiant Porphyry Cu-Mo Deposit. In Chapter 3, *Special Publication 11: Andean Metallogeny: New Discoveries, Concepts, and Updates*. Eds. *Sillitoe, R.H.; Perello, J.; and Vidal, C.E.*, 328pp.
10. Barra, F., Ruiz, J., *Mathur, R.*, Titley, S. and Schmitz, C. (2003) A Re-Os study of sulfides from the Bagdad porphyry Cu-Mo deposit, northern Arizona, USA. *Mineralium Deposita*, v. 38, 585-596.
9. *Mathur R.*, Marschik R., Ruiz, J., Munizaga, F., and Leveille, R., 2003, Reply to Naslund et al. comment: Age of mineralization of the Candelaria iron oxide Cu-Au deposit, and the origin of the Chilean Iron Belt based on Re-Os isotopes. *Economic Geology*, v. 98, no. 5, 4-7.
8. Gilmer, A., Kyle, J. R., Connelly, J. N., *Mathur, R.*, Henry, C. D (2003) Extension of Laramide magmatism in southwestern North America into Trans-Pecos Texas. *Geology*, v. 31, 447-450.
7. *Mathur R.*, Herb, P., Ruiz, J., Hahn, L., and Burgath, K. P. (2003) Re-Os-isotopes applied to epithermal gold deposits near Bucaramanga, northeastern Colombia. *Journal of South American Earth Sciences*; v. 15, 815-821.
6. *Mathur R.*, Marschik R., Ruiz, J., Munizaga, F., and Leveille, R. (2002) Age of mineralization of the Candelaria iron oxide Cu-Au deposit, and the origin of the Chilean Iron Belt based on Re-Os isotopes. *Economic Geology*, v.97 59-71.
5. *Mathur, R.*, Ruiz, J., Munizaga, F., and Zentilli, M. (2001) Reply to McBride's comment: Relationship between copper tonnage of Chilean base-metal porphyry deposits and Os isotope ratios. *Geology*, v. 29, 467-468.
4. *Mathur, R.*, Ruiz, J., Titley, S., Gibbins, S., and Margomoto, W. (2000) Different crustal sources for Au-rich and Au-poor ores of the Grasberg Cu-Au porphyry deposit, *Earth and Planetary Science Letters*, v. 183; 1-2, 7-14.
3. *Mathur, R.*, Ruiz, J., and Munizaga, F. (2000) Relationship between copper tonnage of Chilean base-metal porphyry deposits and Os isotope ratios. *Geology*, v. 28, 555.
2. *Mathur, R.*, Ruiz, J., and Tornos, F. (1999) Age and Sources of the ore at Tharsis and Rio Tinto, Iberian Pyrite Belt, from Re-Os isotopes. *Mineralium Deposita*, v. 34, p 709.
1. Ruiz, J., and *Mathur, R.* (1999) Metallogensis in Continental Margins: Re-Os evidence from porphyry copper deposits in Chile. in *Reviews in Economic Geology: Application of Radiogenic isotopes to ore deposit research and exploration*, eds. Lambert, D., and Ruiz, J. p 112.

### **Invited talks/ Workshops:**

Pennsylvania State University (2001,2004, 2011); University of Utah (2010), Iowa State University (2011), Auburn University (2013), University of Arizona (2009), American Museum of Natural History, New York (2013), Dickinson (2012), Pebble, Alaska (2010,2011), Yanacocha, Peru (2013), Grasberg, Indonesia (2011), Chinese Geological Survey (Nanjing) (2013,2014,2015,2016), SUNY Binghamton (2003), University of Texas (2010), SEG Whistler (2013), IAGOD 2014 (Kunming, China), Chinese National Academy of Science, Guangzhou Institute of Geochemistry (2014, 2017), Chinese Geological Survey, Beijing (2015), Rutgers University (2015), University of

Miami, Ohio (2015), West Virginia University (2016), Carnegie Museum of Natural History Moriarty Science Seminar (2016), Duquesne University (2017), University of Brussels (2018), ISONOSE workshop, Soreze (2018)

## **Abstracts to Professional Conferences:**

### *Extended Abstracts and Proceedings:*

Gold, D., Doden, A., Mbalu-Keswa, C., Tedeski, J., R., Mathur, R. (2016) The rogue kimberlite dikes in Indiana County, PA part 1. Unusual intrusive habit of kimberlite dikes in coal seams. Guidebook for the 81<sup>st</sup> Annual Field Conference of Pennsylvania Geologists, p121-150.

Townley, B., Luca, R. Soto, C., Munoz, M., Aguilar, G., Puig, A., Mathur, R., Reich, M. (2015) Hydromorphic dispersion of metals and geochemical signatures through transported overburden at the Inca del Oro porphyry copper deposit, Northern Chile. 14<sup>th</sup> Chilean Congress, La Serena Chile.

Zentilli, M., Boric, R., Heaman, L., Mathur, R., Hanley, J., (2015) New developments on the Geology of MMH: is it the 'missing half' of Chuquicamata? 14<sup>th</sup> Chilean Congress, La Serena Chile

Mathur, R., Gold, D.P., Ellsworth, C.J., Doden, A.G., Wilson, M., Ruiz, J., Sheetz, B.E., Herman, G.C. (2015) Re-Os isotope evidence of Early Teriary crust faulting and sulfide mineralization in PA and NJ with probable ties to the Chesapeake Bay bolide impact Maryland, USA. GANJ, chpt 3, p 70-81.

Bosbyshell, H., Sorgi, L.A., Blackmer, G., Schenck, W., Mathur, R., Valencia, V. (2015) The tectono-thermal evolution of the central Appalachian Orogen: Accretion of a peri- Gondwanan (?) Ordovician arc. National GSA Fieldtrip Guide 40, 35-59.

Mathur, R., Ruiz, J., Casselman, M.J., Megaw, P., van Egmond, R., (2012) Use of Cu isotopes to distinguish primary and secondary Cu mineralization in the Cañariaco porphyry copper deposit, northern Peru. SEG, Lima, Peru.

Mathur, R., Titley, S., Schillt, W., Wilson, M., Brantley, S. (2010) Exploration geological and hydrometallurgical applications of Cu isotope fractionation: Examples from porphyry copper deposits in the South western United States. Society of Mining and Engineering, Phoenix.

Munizaga, F., Maksaev, V., Fanning, M., Mathur, R., Barra, F., McWilliams, M., and Sanhueza, A. (2008) Geochronology of the Collahuasi porphyry Cu-Mo cluster of North Chilean Andes, 6<sup>th</sup> SAGI conference in Argentina.

Gold, D. P., Doden, A.G., Mathur, R., Mutti, L., Barra, F., Sicree, A. (2006) Sulfide occurrences in central Pennsylvania: *Special Session on Environmental and Engineering Concerns of Sulfide Deposits* in Field trip guide Regional GSA Harrisburg, PA: 95-135.

Munhá, J., Relvas, J.M.R.S, Barriga, F.J.A.S., Conceição, P., Jorge, R.C.G.S., Mathur, R., Ruiz, J., Tassinari, C.C.G. (2005) Os Isotopes Distribution in the Iberian Pyrite Belt. SEG; Beijing, China.

Mathur, R. Munizaga F., Ruiz, J., Makseav V., Hart, G., Vervoort, J., (2004) Variation of Copper and Molybdenum Isotope ratios in sulfide ores from the different mineralization events of the El Teniente copper deposit. AVCEI conference, Volcanism and its impact on Society, Pucon, Chile.

Mathur, R., Ruiz, J., Liernann, L., Brantley, S. (2004) Cu isotope fractionation associated with oxidation of Cu sulfide with and without *T. ferrooxidans*. Extended Abstract WRI conference. Saratoga Springs, NY

Mathur, R., Ruiz, J., and Munizaga, F. (2001) Insights into Andean metallogenesis from the perspective of Re-Os analyses of sulfides. Extended Abstract in III SSAGI International Conference volume 3, Pucon, Chile.

### *Abstracts with undergraduate students involved with research:*

- Mathur, R., Arribas, A., Megaw, P., Meyer, D., Stroup, S., Arribas, I. (2017) Silver isotope fractionation in native silver: Potential mechanisms and implications to ore genesis. SEG Beijing.
- Kopera, K., Allin, N., Mathur, R. (2015) Copper isotope compositions of olivine from mantle xenoliths from San Carlos, Arizona. GSA Baltimore.
- Allin, N., Song, S., Kopera, K., Chen, D.D., Guo, K., Mathur, R., (2015) Identification of two metal contaminants in solution using copper isotopes in first, second and third order stream near Dexing Mine, China. GSA, Baltimore.
- McMullen, C., Mathur, R., (2014) Fe-oxide staining on the Tuscarora Sandstone. Regional GSA, Lancaster, PA.
- Condon, D., Mathur, R., Simpson, T., Mendoza, N., Nguyen, M. (2014) Cu isotope fractionation used to determine supergene processes at the Yanacocha Mine in Northern Peru. Regional GSA, Lancaster, PA.
- Downey, K. Wivell, E., Munk, L., Cardenas, M., Annel, H., Lang, J., Mathur, R. (2013) A case study of using copper isotope ratios for mineral exploration at Pebble porphyry Cu-Au-Mo deposit Alaska. GSA Northeast Regional Meeting.
- Nguyen, M., Mathur, R., Munk, L., Lang, J., Gregory, M., (2011) Cu isotope signatures as an exploration tool at the Pebble Deposit, Alaska. Regional GSA, Pittsburgh, PA.
- Paul, J., Prush, V., Mathur, R., Ebersole, C., Jin, L., Brantley, S. (2010) Cu isotope study of soil developed on the Marcellus shale. National GSA Denver Co.
- Prush, V., Mathur, R., Ebersole, C., Jin, L., Brantley, S. (2009) Major element and copper isotopic geochemical analysis of Marcellus shale and associate soils. National GSA Portland, Oregon.
- Dendas, M., Mathur, R., Titley, S. (2009) Patterns in the copper isotopic composition of minerals in porphyry copper deposits in the Southwestern United States of America. National GSA Portland, Oregon.
- Dendas, M., Mathur, R., Titley, S. (2009) Cu isotope study of the Silver Bell Porphyry copper deposit. 24<sup>th</sup> International Applied Geochemistry Conference, Fredericton, NB.
- Mathur, R., Titley, S., Brantley, S., Casselman, M., Stegen, R., Wall, A., Fornadel, A., (2008) Application of transition metal isotope fractionation for understanding supergene processes. Gordon Conference, Il Ciocco, Barga, Italy.
- Fornadel, A., Mathur, R., Brantley, S. (2008) Geochemical and physical analysis of soil developed on the Marcellus shale in central Pennsylvania. GSA NE Regional meeting Buffalo.
- Phillips, A., Mathur, R., Titley, S., Stegen, R., Parker, D., (2007) Copper mineralization and isotope fractionation in porphyry copper deposits. GSA Abstracts with Vol. 42 No. 1.
- Pierotti, G., Mathur, R., Smith, Robert, Barra, F. (2006) Re-Os molybdenite ages for the Antietam Reservoir, Eastern PA, A story of open-system behavior of Re-Os isotopes in molybdenite. GSA Abstracts with Programs Vol. 38, No. 2
- McWilliams, A., Mutti, L., Mathur, R., (2006) New homogenization data for fluid inclusions in fault related quartz veins in the Bald Eagle FM. In central PA. GSA Abstracts with Programs Vol. 38, No. 2
- Hodel, L., Smith, R., Mathur, R., Hirtz, A. (2006) The mapping and analysis of Au-bearing quartz veins in Ganarin, Ecuador. Abstracts with Programs Vol. 38, No. 2

Phillips, A., Lehmann, D., Pierotti, G., Stephanic, M., Fischer, D., Mathur, R. (2006) Patterns in nitrate loads in an agriculturally-impacted stream and implications for best management practices. Northeastern Regional GSA meeting Harrisburg, PA.

Detrie, T., Mutti, L., Mathur, R., Gold, D., Sicree, A. (2005) Quartz sulfide mineralization of the Bald Eagle formation of Skytop mountain, Near State College. GSA abstract v. 37, no1. Regional meeting, Saratoga Springs, NY.

Bonsall, T., Mutti, L., Mathur, R., Munizaga, F., Makseav, V. (2005) Fluid inclusion microthermometry of the El Teniente supergiant Cu-Mo deposit of Chile. GSA abstract v. 37, no1. Regional meeting, Saratoga Springs, NY.

Zrikavapar, A., Mathur, R., (2005) Comparison of peridotite nodules from Lanzarote, Canary Islands, and San Carlos Indian Reservation, Arizona. GSA abstract v. 37, no1. Regional meeting, Saratoga Springs, NY.

Teeters, E., Diesel, B., Mathur, R., Lehmann, D. (2004) Impact of Drought and Wet Season Conditions upon Nutrient Concentrations in an Agriculturally-Influenced Stream. Geological Society of America *Abstracts with Programs*, Vol. 36, No. 2, p. 108.

Diesel, B., Teeters, E., Mathur, R., Lehmann, D. (2004) The Effects of Traditional and CAFO Agriculture on Summer Nitrate Levels in Stream Water. Geological Society of America *Abstracts with Programs*, Vol. 36, No. 2, p. 108.

Teeters, E., Mathur, R., Lehmann, D. (2002) Water Quality nutrient analysis of Spruce Creek, Pennsylvania. GSA National Conference, Denver, CO.

#### *Abstracts:*

Powell, W., Mason, A., Bankoff, A., Mathur, R., Bulatović, A., Filipović, V. (2018) Sn Isotopic Evidence for Late Bronze Age Exploitation and Trade of Multiple Tin Sources in the Central Balkan Region. [BRONZE AGE TIN – Geological sources, production, and distribution of tin in Bronze Age Eurasia. Mannheim, Germany.](#)

Arribas, A., Mathur, R., Arribas, I., Megaw, P., Wilson, M. (2017) The isotopic composition of silver and its variation in silver-bearing ore deposits. SEG, Beijing.

Ucurum, A., Demir, C.S., Ekici, T., Otlu, N., Arehart, G.B., Mathur, R. (2017) Stable isotope (O,D,S, Cu) geochemistry of selected gold deposits from eastern Turkey. SEG Beijing.

Powell, W., Mathur, R., Junming, Y. (2017) Sn Isotopic Evidence of Vapor Transport of Sn in Shallow-Level Mineralization Systems within the Gejiu Polymetallic Ore Field. SEG, Beijing.

Gregory, M. and Mathur, R. (2017) Understanding copper isotope behavior in the high temperature magmatic-hydrothermal porphyry environment. SGA, Quebec.

Powell, W., Mathur, R., Bankoff H. A., Bulatović, A., Filipović, V. (2017) Determining Prehistoric Mining Practices in Southeastern Europe Using Copper Isotopes. EGU.

Mathur, R. Song, S., Nguyen, M., Allin, N., Simpson, T., St. George, P. (2016) Copper isotope values in waters, ores, leach cap minerals and plants used as vectors to ore deposits. Gordon Research Conference, Switzerland.

Huska, D., Powell, W., Mathur, R., Bankoff, H., Filipović, V., Bulatović, A. (2015) Isotopically provenancing Tin in bronze artifacts, central Balkans. GSA Baltimore.

Matt, P., Powell, W., Mathur, R., Delorraine, W. (2015) Zinc isotope character of ore bodies at Balmat, NY: Preliminary results. GSA Baltimore.

- Maynard, A., Bruseseke, M., Mathur, R., (2015) Copper isotope compositions of Cenozoic mafic rocks in the Northern Great Basin and Snake River Plain (USA). GSA Baltimore.
- Белогуб, Е. В., Mathur, R., Садыков, С.А., Новоселов, К. А. (2015) Первые данные об изотопном составе меди и серы в минералах из руд Удоканского месторождения медистых песчаников. IGEM RAS, Moscow.*
- Blackmer, G., Bosbyshell, H., Mathur, R. (2015) Detrital zircon evidence for early Paleozoic sediment sources on the Laurentian margin. Northeastern GSA.
- Mathur, R. (2014) Cu and Mo isotope compositions in waters, rocks, minerals, plants and soils as ore deposit exploration tools. IAGOD, Kunming China.
- Mathur, R., Munk, LA, Tornos, F., Ruiz, J., Song, S., Gou, S., Reich, M., Townley, B. (2014) Consistent copper isotope footprints in surface and groundwater from multiple deposit types. SEG, Denver.
- Mathur, R., Linton, P., Ruiz, J. (2013) Pre-metamorphic Re-Os isochron ages from low concentration Au rich sulfides and native Au from Obuasi, Navachab, and Geita Africa. SEG Whistler.
- Braxton, D., and Mathur, R. (2013) Copper Isotopic Vectors in Fe-oxides to Supergene Enrichment: A Case Study of the Quellaveco Porphyry copper Deposit, Southern Peru. SEG Whistler.
- Bosbyshell, B., Blackmer, G., Mathur, R., Srogi, LA., Schenck, W.S., (2013) Significance of detrital zircon ages in the Central Appalachian Piedmont of southeastern PA and northern DL. GSA Denver.
- Wall, A., Heaney, P., Mathur, R., Gammons, C.G., Brantley, S.L. (2013) Using Cu isotopes to study fluid-rock interaction in the Butte mining district, Montana. GSA Denver.
- Ma, L., Jin, L., Deere, A. L., White, T., Mathur, R., Brantley, S.L. (2012) How lithology and climate affect REE mobility and fractionation along a shale weathering transect of the Susquehanna Shale Hills CZO. AGU San Francisco.
- Conly, A., and Mathur, R. (2012) Integrated Sr-Pb-S-O-Cu Isotopes of Sulfide and Mn-oxide Mineralization of the Boléo Cu-Co-Zn-Mn District, Baja California Sur, Mexico. Goldschmidt Montreal, Canada.
- Naslund, H.R., Henriquez, F.J., Nystrom, J.O., Naranjo, J.A., Mathur, R. (2012) Origin of Magnetite “Lava Flows” at El Laco Volcano, Chile. Goldschmidt Montreal, Canada.
- Fornadel, A.F., Spry, P.G., Mathur, R., Jackson, S.E., Chapman, J.B. (2012) Methods for the determination of Te isotope compositions of minerals in the system Au-Ag-Te by MC-ICP-MS. Goldschmidt Montreal, Canada.
- Bosbyshell, H., Blackmer, G., Srogi, L., Mathur, R., Crawford, M., Valencia, V. (2012) Detrital zircon ages from the Wissahickson formation, Southeast Pennsylvania and northern Delaware: regional tectonic implications. NE GSA Hartford, CT
- Graybill, E., Ganis, R.G., Mathur, R., Bosbyshell, H., Kidder, D., L. (2012) Implications of new ~960MA dates for the Sams Creek volcanics/ Wakefield carbonate complex. Westminster Terrane, MD. NE GSA Hartford, CT.
- Mathur, R., Nguyen, M., Munk, L., Lang, J., Gregory, M. (2011) Geologic Exploration application of Cu isotope signatures of ores and surface waters at the Pebble Au-Cu-Mo porphyry deposit, Alaska. SGA Antofagasta Chile.
- Braxton, D., and Mathur, R. (2011) Exploration Applications of Copper Isotopes in the Supergene Environment: A Case Study of the Bayugo Porphyry copper-gold Deposit, Southern Philippines. SGA Antofagasta Chile.
- Saunders, J., Kamenov, G.D., Bruseseke, M., Hames, W. E., Mathur, R. (2011) Hydrothermal precious metal and sulfide nanoparticle transport and deposition and the genesis of bonanza epithermal ores. GSA National meeting, Minnesota.

- Dendas, M., Mathur, R., Ruiz, J., Porter, J. (2011) Pb and Cu isotope tracers of fluid flow at Bingham Canyon Porphyry copper deposit. GSA National meeting, Minnesota.
- Migueléiz N., Mathur, R., Tornos, Velasco, F., Videira, F., (2011) Cu isotope geochemistry in the unusual Las Cruces supergene copper deposit. Goldschmidt, Pargue.
- Mathur, R., Gold, D., Doden, A. (2011) U-Pb ages from zircons in the Middle Ordovician bentonite horizons in Central PA. Regional GSA Pittsburgh.
- Yesavage T, Liermann L, Jin L, Mathur R & Brantley S (2010) Iron Cycling in the Shale Hills Watershed of Central Pennsylvania: Possible Links between Microbiology and Iron Chemistry. Goldschmidt, Knoxville, TN.
- Mathur, R., Cu isotope fractionation and ore deposits processes (2010) GSA National meeting Denver.
- Wall, A. J., Heaney, P. J., Mathur, R., Gammons, C. H., Brantley, S. L.. (2010) Cu isotope systematics of the Butte Mining District, Montana. Goldschmidt, Knoxville, TN.
- Thibodeau, A., Ruiz, J., Chesley, J., Thomas, N., Killick, D., Mathur, R. (2010) Copper Isotopes in Archaeology: Case Studies of Archaeological Metals and Minerals in the Southwestern U.S. International Symposium on Archaeometry.
- Borg, G., and Mathur, R. (2009) Concomitant Cu isotope and base metal fractionation at the supergene Skorpion Zinc deposit, Namibia. German mineralogical society.
- Mathur, R., Titley, S., Brantley, S., Casselman, M., Wilson, M., (2009) Cu isotope fractionation utility as an geochemical exploration tool. 24<sup>th</sup> International Applied Geochemistry Conference, Fredericton, NB.
- Wall, A., Heaney, P., Mathur, R. (2008) Cu Isotope Fractionation during Dissolution of Cu Sulfide Minerals: Assessing Metal Sources in Acid Mine Drainage with Isotope Analysis and Time-Resolved Synchrotron X-Ray Diffraction. GSA National Conference, Houston, TX.
- Mathur, R., Scheetz, B., Wilson, M., Gold, D., Doden, A. (2008) Re-Os isotopic evidence for Cenozoic mineralization in the central Pennsylvanian Valley and Ridge Province. Regional AAPG Pittsburgh conference.
- Wall, A., Heaney, P., Mathur, R. (2007) Insights into copper isotope fractionation during the oxidative phase transition of chalcocite, using time-resolved synchrotron X-ray diffraction. *Geochimica Cosmochimica Acta*, v. 77, A1081.
- Mathur, R., Brantley, S., Wall, A., Kimball, B., Barra, F., Titley, S., R., Munizaga, F. Makseav, V. (2007) Potential utility of Cu isotopes to recognize secondary Cu mineralization and the degree of enrichment. *Geochimica Cosmochimica Acta*, v. 77, A636.
- Kimball, B., Brantley, S., Mathur, R., (2007) Using copper isotopes to distinguish biotic and abiotic effects on acid mine drainage. *Geochimica Cosmochimica Acta*, v. 77, A485.
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- Makseav, V., Munizaga, F., Barra, F., Mc Williams, M., Mathur, R., (2006) Geochronology of the Cretaceous porphyry copper deposits of the coastal cordillera of northern Chile. GSA Philadelphia, Fall

- Gold, D., Doden, A., Mathur, R., Sicree, A., Mutti, L. (2006) A case history of highway construction through a sulfide vein deposit in Centre County, PA. GSA Philadelphia, Fall
- Wasylenki, L., Mathur, R., Liermann, L., Anbar, A., Brantley, S. (2006) Toward multi-element isotopic biosignatures: experimental investigation of microbial metal assimilation. Goldschmidt, Australia.
- Gold, D., Doden, A., Mathur, R., Mutti, L. (2006) Pandora's Box: the unroofing of sulfide veins at Skytop, Centre County, Pa. Abstracts with Programs Vol. 38, No. 2
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- Mathur, R., Ruiz, J., Marschik, R., Munizaga, F., (2002) Molybdenite age for Candelaria Iron Oxide Cu-Au deposit and a comparison of the Re-Os isotopic signature of the ore from the Chilean Iron Belt. GSA National Conference, Denver, CO.
- Ruiz, J., Krik, J., Mathur, R., Barra, F., Chesley, J. (2002) Behavior of Re-Os and Au in hydrothermal magmatic systems. Conference on Highly Siderophile Elements in terrestrial and meteoric samples: implications for planetary differentiation and igneous processes. Nancy, France.
- Ruiz, J., Mathur, R., Young, S., Brantley, S. (2002) Controls of Copper Isotope Fractionation. Goldschmidt conference, Switzerland.
- Ruiz, J., Mathur, R., Brantley, S., Liermann L. (2002) Experimental constraints on copper fractionation in natural environments: Sixth International Symposium on the Geochemistry of the Earth's Surface, Honolulu, Hawaii
- Ruiz, J., Mathur, R., Uhrie, J., Hisky, P. (2001) Copper Isotope Fractionation in Porphyry Copper deposits: A controlled experiment. AGU, San Francisco.
- Marschik, R., Mathur, R., Spangenberg, J. E., Ruiz, J., Leveille, R., and De Almeida, A. J. (2001) The Serra Verde Cu-Mo-Au deposit, Carajas Mineral Province, Para State, Brazil. GSA National Conference, Boston.
- Mathur, R., Ruiz, J., Titley, S., and Gibbins, S. (2000) Re-Os evidence for different sources for Cu and Au in the Grasberg Cu-Au porphyry deposit. GSA, National Conference Reno.
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- Ruiz, J., Mathur, R., and Munizaga, F. (2000) Evolution of base-metal porphyry mineralization in Chile based on Re-Os isotopes. In abstract for 31<sup>st</sup> International Geological Congress.

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McCandless, T.E., Mathur, R. D., and Ruiz, J., (1998) The osmium isotopic record of Precambrian seafloor massive sulfides. Eos, Trans. AGU, San Francisco.

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