

Rosalba Bonaccorsi's CV (11/06/2014)

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Dr. Rosalba Bonaccorsi is an interdisciplinary scientist working at the SETI Institute and NASA Ames Research Center. In 2001 she obtained her Ph.D. in Geological, Marine and Environmental Sciences from the University of Trieste (Italy). Since 2005 she has expanded her interest to the habitability of mineralogical Mars analogs, and very dry desert regions worldwide, including the Mojave, Antarctica, Atacama (Chile), and Australia, often as a NASA Spaceward Bound team member. Rosalba joined the SETI Institute in 2008, and is keen to achieve a wide picture of where life and its signatures are most successfully distributed, concentrated, preserved, and detected. Since 2008, Rosalba has been working in Death Valley on the Ubehebe Volcanic Field. In 2012 Rosalba joined the Volunteer Program as Field Researcher in support of the Resources Management's conservation effort in Death Valley Natl. Park. In collaboration with NASA scientists, she is applying results from this research to Mars Science Laboratory mission objectives. Formerly a teacher, she has been involved with Education and Public Outreach with non-profit organizations since 1989.

1. EDUCATION

- 1997: M.S in Natural Sciences. University of Milano (Italy).
- 2001: Ph.D in Geological, Marine and Environmental Sciences– University of Trieste, Italy

2. AWARDS AND HONORS

- 2014-2016: Co-I NSF-funded Research Experiences for Undergraduates (REU) program to the SETI Institute.
- 2009 – 2011: Co-I Planetary Protection “Raman Spectroscopy for Bioburden Monitoring”.
- 2007 NASA Group Achievement Award to the “2006 Spaceward Bound Atacama Desert Expedition”.
- 2006 NASA Group Achievement Award to the “Mars Analog Research Technology Experiment”.
- 2005 – 2008: NASA Post Doctoral Fellowship at NASA Ames Research Center, California
- Mar – May 2005: Short-Term-Mobility Fellowship Grant (Italian NRC).
- 2000 – 2001: Young Research Fellowship. (Sponsor: University of Trieste).
- 1997 Doctoral Fellow award at University of Trieste (Italy).

3. PROFESSIONAL ACTIVITY

- **Jan. 2009–present**: Research Scientist at Carl Sagan Center of SETI Institute and NASA Ames.
- **2011–2013**: Research Associate for MSL/SAM Instrument Team (Co-I, CP. McKay).
- **2009 –present**: Field Researcher at Death Valley National Park (California).
- **Sept. 2013 – Mar. 2014**: Organizing Committee for “MarsFest 2014” Death Valley NP.

- **Sept. 2012 – Mar. 2013:** Organizing Committee for “MarsFest 2013” Death Valley NP.
- **May 2011– Mar. 2012:** Organizing Committee for the “First *Ever* Mars & Mojave Festival” Death Valley NP.
- **2005 – 2008:** NASA Ames Post Doctoral Associate.
- **Sept. 2004 – Jun. 2006:** MARTE Project Team member.
- **Dec. 2003** European Space Agency (ESA/ESTEC) ExoMars Rover Payload review.
- **Dec. 2006:** ESA/ESTEC ExoMars Rover Payload Confirmation review.
- **Feb. 2001 – Nov. 2005:** Research Associate at University of Trieste, Italy
- **Feb. 2002–2003:** Researcher and Consultant at Geokarst Engineering Srl AREA Science Park, Trieste (IT).
- **Jun. – Aug. 2001:** Sailing Scientist onboard drillship JOIDES_Resolution for ODP Leg-197.
- **Jul. 1999 – Sept. 2000:** Visiting Scholar at Lamont-Doherty Earth Observatory of Columbia University (NY, USA).

- ***Field Expeditions Science Team member & Instructor (in-service teachers, undergraduate students, professionals, and seniors):***

- **November 2013 – March 2014:** Road Scholar Program Field Instructor (Death Valley Natural History Association).
- **June 2012, 2013, 2014:** ***Field instructor/organizer*** SETI Inst. REU booth camp (Lassen NP).
- **March 22 – 28, 2014:** Mojave Desert Spaceward Bound (SB)training camp (California)
- **June 13 – 18, 2013:** Idaho Spaceward Bound Expedition (USA).
- **June 17 – 22, 2012:** Idaho Spaceward Bound Expedition (USA).
- **April 21 – May 2, 2012:** Namib Desert Spaceward Bound Expedition (Namibia).
- **July 9 – 20, 2011:** Pilbara Spaceward Bound Expedition (WA).
- **June 25 – 30, 2011:** Idaho Spaceward Bound Expedition (USA).
- **April – 13-26, 2010:** Namib Desert Spaceward Bound Expedition (Namibia).
- **June 7 – 16, 2009:** South Australian Desert Spaceward Bound Expedition (SA).
- **March 25-30, 2007; March 23-27, 2009; March-April 2010 and March 20-25 2011; April 2012:** *Other* Mojave Desert Spaceward Bound expeditions (California).
- **June 19-July 1, 2006; March 20-April 14, 2008; May 2010:** Atacama Desert SB expeditions.
- **March 2005:** Shetland Islands and Antarctic Peninsula expedition onboard *Explorer*.
- 1999 - to present:** first Author of over 120 presentations at international meetings and conferences.

Professional associations: American Geophysical Union (AGU) member since 2000 - Clay Mineral Society (CMS) since 2008; Geological Society of America (GSA) since 2013.

4. RELEVANT PUBLICATIONS (* undergraduate co-authors)

Willson D., Rask J. C., George S. C., **Bonaccorsi, R.**, de Leon P., Blank J., Slocombe J., Silburn K., Steele H., Gargarno M., and McKay C.P., 2013, The performance of field scientists undertaking observations of early life fossils while in simulated space suit. *Acta astronautica*, 93, 193-206.

Davé, A., Thompson, S., McKay, C.P., Zacny, K., Paulsen, G., Mellerowicz, B., Glass, B., Willson, D., **Bonaccorsi, R.**, and Rask, J. 2013. The Sample Handling System For The Mars Icebreaker Life Mission: From Dirt To Data, *Astrobiology*, 13(4):354-369.

Bonaccorsi, R., Friese, R., McKay, C.P., and Willson, D*., 2012. Planetary Analog Research and Climate Change Monitoring in a Land of Extremes: The Ubehebe Volcanic Field (Death Valley, CA). Abstract P11B-1839, 2012 Fall Meeting, AGU, San Francisco, Calif., 3-7 Dec.

Bonaccorsi, R., 2011 Preservation Potential of Organics and Habitability of Clay Minerals and Iron-rich Environments: Novel Analogs for MSL Landing Sites. In: Cellular Origin, Life in Extreme Habitats and Astrobiology, Vol. 18. *STROMATOLITES: Interaction of Microbes with Sediments*. Tewari, V. Seckbach, J. (Eds.). 2011, 490 pp

Bonaccorsi, R., McKay, C.P. and Chen, B. 2010 Biomass and habitability potential of clay minerals- and iron-rich environments: Testing novel analogs for Mars Science Laboratory landing sites candidates, *Philosophical Magazine*, 90 (17) 2309.

Fairén, A.G., Davila, A.F., Lim, D., Bramall, N., **Bonaccorsi, R.**, Zavaleta, J., Uceda, E.R., Stoker, C.R., Wierzchos, J., Amils, R., Dohm, J.M., Andersen, D. & McKay, C.P., 2010. Astrobiology through the Ages of Mars: The Study of Terrestrial Analogs to Understand the Habitability of Mars, *Astrobiology*. 10(8):821-843.

Bonaccorsi, R., and Stoker, CR., 2008. Science Results from a Mars Drilling simulation (Rio Tinto, Spain) and Ground Truth for Remote Observations. *Astrobiology*, 8(5): 967-985.

Miller, D.P., **Bonaccorsi, R.**, and Davis, K, 2008. Design and Practices for use of Automated Drilling and Sample Handling in MARTE While Minimizing Terrestrial and Cross Contamination. *Astrobiology*, 8(5): 947-965.

Parro, V., et al., including **Bonaccorsi, R.** 2008. SOLID2: An antibody array-based life detector instrument in a Mars Drilling Simulation Experiment (MARTE). *Astrobiology*, 8(5): 987-999.

Davila, A.F., Fairén, A.G., Duport, L.G., Stoker, C.R., Amils, R., **Bonaccorsi, R.**, Zavaleta, J., Lim, D., Schulze-Makuch, D., and McKay, C.P., 2008 Subsurface formation of oxidant on Mars and implications for the preservation of organic biosignatures. *EPSL*, 272(1-2): 456-463.

Stoker, CR et 31 al., including **Bonaccorsi, R** 2008. The 2005 MARTE Robotic Drilling Experiment in Rio Tinto Spain: Objectives, Approach, and Results of a Simulated Mission to Search for Life in the Martian subsurface, *Astrobiology*, 8(5): 921-945.

Cannon, H.N., C.R. Stoker, S.E Dunagan, K. Davis, J. Gomez-Elvira, B.J. Glass, L.G. Lemke, D. Miller, **R. Bonaccorsi**, M. Branson, S. Winterholler, and J. Zavaleta, 2007. MARTE: Technology Development and Lessons Learned from Mars Drilling Mission Simulation. *Journal of Field Robotics*, 24(10):877-905.

Bonaccorsi, R., 2004. Organic in Deeply Buried Fossil Soils Cored during the Ocean Drilling Program (LEG 197): their Model Formation and Use as Test Beds for Mars Soil Analogues. Proceedings of the Third European Workshop on Exo-Astrobiology, 18 - 20 November 2003, Madrid, Spain. Ed.: R. A. Harris & L. Ouweland. ESA SP-545, Noordwijk, Netherlands: ESA Publications Division, ISBN 92-9092-856-5, 2004, p. 173-174.

Bonaccorsi, R., and McKay, 2008 Total biomass and organic carbon along a N-S moisture gradient of the Atacama Region, Chile [abstract 1489]. In 39th Lunar and Planetary Science Conference Abstracts, LPI Contribution, Houston.

Bonaccorsi, R., T. Quaia, L.H Burckle, R.F. Anderson, R. Melis, and A. Brambati, 2007. C-14 age control of pre- and post-LGM events using *N. pachyderma* preserved in deep-sea sediments (Ross Sea, Antarctica). In *Antarctica: A Keystone in a Changing World* – Online

Proceedings of the 10th ISAES X, edited by A.K. Cooper and C.R. Raymond et al., USGS Open-File Report 2007-1047, 4 p.

5. SELECTED MEETINGS & PRESENTATIONS

Bonaccorsi, R., Zent, A., McKay, C.P., 2014. Monitoring Surface Moisture of Crater-fill Sediment in Extreme Hydroclimatic Conditions (Ubehebe Volcanic Field, Death Valley, California). AGU Fall Meeting, San Francisco 15-19 December 2014. Paper #EP53A-3632.

Radu, H.I., **Bonaccorsi, R.,** and Radu, C.E 2014. Erosion Effects of Liquid Water and Volatiles in a Former Lacustrine Environment - From Gale Crater to Death Valley. AGU Fall Meeting, San Francisco 15-19 December 2014. Paper#P31D-4013.

Bonaccorsi, R., Baker, L., Zent, A.P., Valdre', G, Willson, D., Friese, R., Mckay, C.P. 2014 Source- to- Sink of Crater Fill Deposits in Arid Hydroclimatic Conditions (Ubehebe Volcanic Field, Death Valley, CA). 2014. Paper No. 175-13. 2014 GSA Annual Meeting in Vancouver, British Columbia, 19–22 October 2014.

Bonaccorsi, R., Baldino, T., Jones, A.J.P., Kyriazis, S.F., Devore, E., Fuhrmann, K.K., Mckay, C.P., Willson, D., Mahaffy, P.R., and Bleacher, L.V., 2014. Marsfest Events and on Site Outreach Activities in Death Valley Natl. Park: A Journey Into A Crater 2014. Paper No. 258-8. 2014 GSA Annual Meeting in Vancouver, British Columbia, 19–22 October 2014.

Bonaccorsi, R., Jones, A.J.P., Baldino, T., Bleacher, L.V., and C.P. McKay 2014. MarsFest: an Annual Planetary Analog Event Hosted by Death Valley National Park. [abstract 2904]. 45th LPSC March 18–22, 2013, The Woodlands, Texas.

Jones, A.J.P., **Bonaccorsi, R.,** Kyriazis, S., Baldino, T., Bleacher, L.V., and L. Coe, 2013. Mars And The Mojave: A Planetary Analog Festival In Death Valley National Park. [abstract 2846]. 44th LPSC March 18–22, 2013, The Woodlands, Texas.

Bonaccorsi, R., Friese, R., McKay, C.P., and Willson, D. 2012. Planetary Analog Research and Climate Change Monitoring in a Land of Extremes: The Ubehebe Volcanic Field (Death Valley, CA). AGU Fall Meeting, San Francisco 3-7 December 2012. Abstract #P11B-1839.

Bonaccorsi, R., Kyriazis, S., Coe, L, and McKay, C.P, 2012 Astrobiology Field Analog Research, Education, and Conservation at the Ubehebe Volcanic Field (Death Valley National Park, California): Discovery and Awareness for a possible tomorrow. AbSciCon 2012 #1132, 16-20 April, Atlanta, GA.

Bonaccorsi, R., Willson, D., McKay, C.P, Valdre', G., 2012 Astrobiology field research in a High-Fidelity Desert Analog Site: The Ubehebe Volcanic Field (Death Valley, California). Astrobiology Science Conference, AbSciCon 2012 #3102, 16-20 April, Atlanta, GA.

Bonaccorsi, R., Shirey T.B., Vimercati, L., McKay, C.P., and Chen, B., 2010. Astrobiology of Clays: Habitability potential and microRaman detection of biosignatures (LPS, ATP, and DNA) in clay minerals analogs for Mars Science Laboratory and Exomars missions. Paper IAA-S10-0203. 2nd SETI Conference, London 2010 - IAA Symposium on SEARCHING FOR LIFE SIGNATURES, 6-8 October 2010, Kavli Royal Society International Centre, London (UK).

Bonaccorsi, R. and McKay, C. P. 2010. Biomass and Habitability Potential of Clay Minerals from Desert Analogs: Astrobiology Investigations for MSL11 Landing Site Candidates. Astrobiology Science Conference 2010. Abstract #5668

Bonaccorsi, R. and McKay, C.P. 2009. Gram-negative Biomass in Clay Minerals Analogs: Testing Habitability Potential for the 2011 Mars Science Laboratory Mission, Eos, Vol. 90, Number 52, 29 December 2009, Fall Meet. Suppl., Abstract P43C-1444.

Bonaccorsi, R., Stoker, C.R., and the MARTE Team. 2009. Organics-bearing phyllosilicates under hyperacidic and oxidizing conditions: preservation potential and application to Mars. Oral pres. Symposium MC1: *Clay Minerals in Extraterrestrial Environments*. XIV International Clay Conference, Castellaneta Marina, Italy, 14-20 June 2009.

Tanaka, Z., Beer, T., McKay, C.P., **Bonaccorsi**, R., Gu, C., and Chen, B. 2009. Raman Imaging for High Throughput Biomarker Field Detections. Instruments and Methods for Astrobiology and Planetary Missions XII. Edited by Hoover, R; Levin, B; Gilbert V; Rozanov, A.Y; Retherford, K.D. SPIE Proceedings, 7441: 74410I-74410I-6.

Bonaccorsi, R. 2008. Organics in Phyllosilicate-rich materials from the Rio Tinto, Spain and their relevance to phyllosilicate-bearing outcrop seen on Mars. Clay Mineral Society Symposium, 8 March, New Orleans.

Bonaccorsi, R., and McKay, 2008 Total biomass and organic carbon along a N-S moisture gradient of the Atacama Region, Chile [abstract 1489]. In 39th Lunar and Planetary Science Conference Abstracts, LPI Contribution, Lunar and Planetary Institute, Houston.

D. Miller and **Bonaccorsi**, R. 2008 Lessons Learned from Microbial Contamination in MARTE Field Tests. AbSciCon 2008. Santa Clara, CA, April 14-17 2008.

Glass, B., Cannon, H., **Bonaccorsi**, R., and Zancy, K., 2006. Mechanical Alteration and Contamination Issues in Automated Subsurface Sample Acquisition and Handling. AGU Fall Meeting, San Francisco 11-15 December 2006.

Bonaccorsi, R., Stoker, C.R., and the MARTE Project Team, 2006. Subsurface Organics in Aseptic Rock Samples From the Mars Analog Rio Tinto Experiment: What Life lies Beneath? – AbSciCon-06, Washington DC, 26-30 March, 2006.

Bonaccorsi, R., Burckle, L., Brambati, A., Piotrowski, M.A., Quail, T., Finocchiaro, F. and Piani, R. 2000. Multi-component analyses on Diamicton Mud Grains (GC Basin, Ross Sea, Antarctica). Suppl. to EOS, May 9, 2000. P. 269.

Bonaccorsi, R., Finocchiaro, F., Quail, T. & Brambati, A. 2000. From basal till to open-water sedimentation: Pleistocene to Holocene Changes in ANTA95-77C2 (Ross Sea, Antarctica) *Terra Antarctica Reports* 4:185-198.

Bonaccorsi, R., Brambati, A., Busetti, M., Fanzutti, G.P., 2000, Relationship among X-ray lithofacies, magnetic susceptibility, P-waves velocity and bulk density in Core ANTA95-89C. *Terra Antarctica Reports* 4, 241-258.

6. BOOK CHAPTERS

Chen, B., Cabrol, N., Stoker, C.R, McKay, C.P., **Bonaccorsi**, R., Zavaleta, J., Dunagan, S., Rodriguez-Manfredi, J.A., Gomez Elvira, J., & Rul, F. 2007 Raman spectra identifications of mineral and organic constituents. *NASA Science Technology Conference* (NSTC2007) June 19-21 Univ of Maryland.

Bonaccorsi, R., 2006. Using Stable Isotopes (C, N) to constraint organics in sub-basement fossil soils (Ocean Drilling Program-Leg 197; N. Pacific): A possible example of isolated Atmosphere-land-ocean systems (IAEA-CN-118/138). In: Applications of Isotopes in environmental studies: aquatic forum 2004. 110-111. IAEA, Vienna. ISBN: 920111205x.

Bonaccorsi, R., Burckle, L.H, Brambati, A., And Piotrowski, A, M., 2005 Constraining subglacial settings using clay-supported IRD (Mud Grains) in Antarctic Marine Sediment: a framework for Astrobiology. *NATO ASI Perspectives in Astrobiology* (Eds. R. Hoover), IOS Press, Amsterdam, The Netherlands. Pp. 221-232.

Shipboard Scientific Party, 2002. In: Duncan, R., Tarduno, J., Scholl, D., **Bonaccorsi**, R., et al., 2002. ODP, Initial Reports 197: College Station, TX (Ocean Drilling Program), p.1-92.

Bonaccorsi, R., and Melis, R., 2001 Persistence of living planktonic foraminifera (*N. pachyderma*) in Antarctic sea-ice from a study of a sediment core (Ross Sea continental margin),

pp. 255-260. In: First Steps in the origin of Life in the Universe. Chela-Flores, Owen, and F. Raulin (eds). Kluwer Acad. Publ: Dordrecht.

7. REPORTS AND OTHER PUBLICATIONS (NON PEER-REVIEW)

Bonaccorsi, R. and the SBA Team. 2009. Science Report of the 2009 Spaceward Bound Australia Expedition <http://marsociety.org.au/library/SBA2009_Bonaccorsi_Full_Report.pdf>

Bonaccorsi, R., January 2003. Compost Maturity Evaluation Test using Humification index and $\delta^{13}\text{C}_{\text{org}}$ - $\delta^{15}\text{N}_{\text{tot}}$ from different compost piles: tracking microbiological processes throughout composting cycles. Geokarst Engineering, s.r.l. Internal report. Pp 45.

Bonaccorsi, R., - February 2002. Investigation on the non-lithic ice rafted debris, or mud grains, as source of continental/reworked organic matter affecting AMS C-14 dating of Antarctic marine sediments. Final Report. University of Trieste- Young Researcher Project 2nd Edition (2000-2001).

Bonaccorsi, R. 2001. Evolution of the Ice Sheet - Ice Shelf -Continental margin system of the Ross Sea area (Antarctica) from late Quaternary sediment records. Ph.D. thesis, University of Trieste 241pp, 50 figs., and 4 plates.

Bonaccorsi, R. 1997. Stratigraphy of the Miocene/Pliocene boundary in the Eastern Mediterranean Basin (ODP Leg 160-969E-11H). Master Thesis in Marine Geology: M.S. Master Degree in Natural Sciences. University of Milano, Italy.

Bonaccorsi, R. 1997. Eco-Ethology and Distribution Pattern of Cetaceans in the Ligurian Sea (NW Mediterranean). Master Thesis in Marine Biology. University of Milano, Italy.

8. SUBMITTED/IN PREPARATION PAPERS

Bonaccorsi et al., 201X. Hollow nodules in lake sediments on Earth and Mars: Pancake or Pizza? In prep.

Bonaccorsi, R and McKay, C.P. 201X. Soil organic matter and microbial biomass along a high resolution N-S moisture gradient in the Atacama Region, Chile: Implications for Earth and Mars. Submitted to J. Arid Environments, 30 September 2011

Bonaccorsi, R., McKay, C.P., and Zent, P.A 201X. Low Carbon-Carbonates analogs to support bulk organics provenance studies on planetary surfaces: Relevance to the Mars Science Laboratory Mission. In prep. for Space and Planetary Sciences.