

CURRICULUM VITAE

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Education

1995 *Ph.D., Geology*, University of Pittsburgh, Pittsburgh, Pennsylvania.

Research topic: Discrimination of Quaternary surfaces surrounding the Whipple Mountains of southeastern California using AVIRIS data.

Instruments utilized during this dissection included Time-of-flight mass spectrometry (ToF-SIMS), X-ray diffraction (XRD), and VIS/NIR Spectrometer (0.4-2.5 microns)

1985 *M.S., Geology*, Old Dominion University, Norfolk Virginia.

Research topic: Lineament Analysis and Tectonic Interpretation for the Central Tharsis Region, Mars.

1979 *B.S., Geology*, Old Dominion University, Norfolk, Virginia.

Present Occupation

Group Supervisor, Geophysics and Planetary Geosciences -Section 3223, Jet Propulsion Laboratory

Research Scientist, Jet Propulsion Laboratory and is currently working on:

- Science research focuses on the tectonic evolution of Mars, primarily the Tharsis region of Mars. Sirenum Fossae tectonic analysis proposal accepted in the Planetary Geology & Geophysics program for funding (initial: 2009-2012; follow on project accepted through 2014).
- Mars Science Laboratory – Funded Co-Investigator (3 years) on CheMin focusing on particle motion. Approved by NASA HQ 4/2010.
- Mars Science Laboratory – Investigation scientist for the Sample Acquisition/Sample Processing and Handling (SA/SPaH).
- Point of contact for materials to be sampled for MSL (prelaunch testing and surface operations).
- Lead on the Solid Sample Library - point of contact for Mars analog materials for multiple JPL projects.
- Director of the JPL Regional Planetary Image Facility (funded for 5 years).

MSL Science topics

- Electrostatics analysis of particle flow.
- Dry Powder Flow characterization.
- Surface materials physical properties under Mars environmental conditions.

Mars Exploration Rovers – Science Collaborator

- Physical properties of soils and rocks.
- Rock Abrasion Tool Investigation Scientist

Science Lead for:

- OASIS/AEGIS project (winner of the NASA Software of the Year Award- 2011).
- AXEL steep terrain rover.

Former Chair (elected -2012 as Chair) - Geological Society of America Planetary Geology Division.

Board of Directors (elected) Los Angeles Figure Skating Club (2017)

Professional Experience

2005-Present Investigation Scientist for the 2009 MSL Sample Acquisition/Sample Handling Subsystem.

Duties include overseeing development of instruments on the surface of Mars, overseeing the development of the hardware on the MSL rover, including wheel development, OCM, and validation of rover testing, science lead for all test samples used for mechanical and instrument testing (SAM, CheMin, Chemcam) during V&V, as well as the JPL science interface for the DRT, Chimera, Drill, arm, and mobility. MSL Research focusing on assuring dry powder flow through MSL hardware on Mars, which includes the effect of electrostatics on particle movement. Chair of the MSL: Dry Powder Working Group, Physical Properties Working Group, and the Electrostatics Working Group.

2008 Lecturer, California Institute of Technology. Lecturing a Lab class on Igneous and Metamorphic petrography for geology undergraduate majors. Class includes hand and thin sample analysis.

2000-2006 Mission Planner and Investigation Scientist for the 2003 Mars Mission. Duties include all missions planning of instruments on the surface (role KOP) of Mars, overseeing the development of the ARES rover operational software, interfacing with the FIDO rover team, as well as the JPL interface (through all phases) and testing for the Rock Abrasion Tool (RAT) and the Instrument Development Device (IDD).

1999-2002 Adjunct Faculty, Pasadena City College. Lectured a course in Planetary Geology.

1998-2004 Adjunct Research Faculty, University of Pittsburgh Department of Geology & Planetary Sciences.

1999-2000 Mission Planner and Investigation Scientist for the 2001 Mars Mission.

1998-1999 Deputy Education and Outreach Coordinator: Mars Exploration Office, Duties include K-12 curriculum and web page developer, and lecturer for all Mars missions.

1998-present Geological Consultant for Rover Development: REE Project (now OASIS), Duties include developing procedures for implementation of science techniques on a rover.

1996-1998 California Institute of Technology Postdoctoral Scholar, Assigned to the Mars Pathfinder Project as the Mars Pathfinder Educational Outreach coordinator as well as science support for the project scientist. Member of the Mineralogy and Geochemistry Science Operations Group and support for the APXS.

1989-1995: Adjunct Faculty / Teaching Assistant University of Pittsburgh, Lectured courses include Geology 0800 (geology for non-science majors), Our Restless Earth 0840 (geology for non-science majors), and Geology 0879 (Introduction to the Planets; for non-science majors). Teaching assisting: Planets, Physical and Historical Geology, Geography.

1989-1995 Academic Tutor, Tutor University of Pittsburgh athletics through the Athletic Academic Student Support Services. Tutored classes included all geology, oceanography, astronomy, and Qbasic and Fortran computing.

1987-1989 Lecturer, NASA Langley Visitor Center, Hampton Virginia. Lectures included all subjects from man to unmanned spaceflights, exploring the universe, to the basics of spaceflight / aeronautical engineering.

1987-1988 Instructor, Computermania, Hampton, VA. Taught beginning and intermediate classes in MSDOS. Duties included on-site installation and training from small companies in the Mid-Atlantic region.

1985-1987 *Secondary High School Instructor, Denbigh High School, Newport News, Virginia.* Taught ninth grade earth sciences which included geology, meteorology, oceanography, and astronomy. Successfully completed a state beginning teaching program (BTAP) and a program designed to increase teaching efficiency (PET).

1981-1983 *Adjunct Faculty, Tidewater Community College, Virginia Beach Campus, Virginia Beach, Virginia.* Taught both lecture and labs for Physical and Historical Geology.

1979-1982 *Teaching Assistant, Old Dominion University, Norfolk Virginia,* Taught laboratory sections in introductory geology classes. Teaching assistant coordinator for laboratory sections.

1975-1985 *Electronic Technician and Stage Manager for Busch Gardens Amusement Park, Williamsburg, VA.* For five years, responsible for all sound and lights for all rides and shows. Management training, two years as a Stage Manager for a German Festhaus Show. Three years supervisor for all parking lots and toll-booths.

1973-1975 *Electrical Engineer Newport News Shipbuilding and Dry Dock Company Apprentice School.* Advanced electrical wiring for Navy Aircraft carriers and missile firing control panels for fast attack submarines.

Current Funding

Planetary Data, Archive, Restoration (NASA) Conversion of Maps into ArcGis, Sarah Noble, 3/2016-2/2018, \$140k

Co-Investigator, MSL CheMin Instrument, 2012-2015, \$150k.

Manager, Regional Planetary Image Facility, 5 year funding, \$675k

Invited Talks (subset*)

Invited Talk, LA Science Series, 2016

Invited Talk, AGU Fall Meeting, 2015.

Invited Talk, Buena Vista Museum of Natural History and Science, 2015

Invited Talk, LAVC, 2014

Invited Talk, CGS, 2011-2013, 2015

Invited Talk, SJGS, 2014

Invited Talk, LABGS, 2014

Invited Talk, AAPG, 2012

Invited Talk, CSUN, 2011

Invited Talk, SB Community College, 2011.

Invited Talk, India Space Agency, Bangalore India, 2005

Keynote address speaker, Oklahoma Geological Survey Annual Meeting, 2003, 2004.

Invited Talk, International Fuel Cell Conference, 2005.

Invited Talk, United Nations Office of Space Science, Beijing China, 2004.

Keynote address speaker, Pittsburgh Spectroscopy Society, Pittsburgh PA, 2004.

Keynote address speaker, AAPG Midwest Regional Meeting, 2003.

Invited Talk, IBM Annual Meeting, New Orleans, LA, 2003

JPL Lab-wide Section Seminar, Topic: Rover Traverse Science, 2002.

Invited Talk, U.S. and Russian Manned Space Program, Costa Rica, 2001

Keynote address speaker, IEEE Aerospace Meeting, 1999, 2000.

Keynote address speaker, University of Virginia Teacher Association Annual Meeting, 1999.

Keynote address speaker, Air National Guard Annual Meeting, St. Louis MO, 1998.

Keynote address speaker, Alabama Teacher Association Annual Meeting, 1998.
Science Lecture KSC for the Mars Pathfinder Launch, 1997.

*Note: hundreds of JPL tours and talks for VIP's, talks to schools and industry since 1995.

Television Appearances

Appearance on Marvelous Marvels, Topic: Water on Mars, 2007
Appearance on In Search Of, Topic: Mars geology and life, 1998.
Appearance on California Gold, Topics: Mars Pathfinder Mission, Mars Rock; 1997, 1998.
Appearance on ABC, CBS, and CNN, Topics: Mars Pathfinder Mission, 1997-1998.
Appearance on PBS, Topics: Mars, 1986.

Workshop/Review Panels/Conference Session Organization

Session Chair, "Results of the MSL Mission", GSA, 2013.
NASA PGG Review Panel, 2013 – Group Lead
NASA Dawn PS Review Panel, 2010 – Section Chair.
NASA PMDAP Review Panel, 2009.
NASA Mars Data Analysis Review Panel, 2007
Session Chair, "Mars Tectonics & Crustal Dichotomy", *Lunar & Planetary Science*, 2007
Program Selection Committee, *Lunar & Planetary Science*, 2007, 2008, 2009, 2010
Program Selection Committee, *Earth & Science Conference*, 2008.
Session Chair, "Mars In-Situ Instrumentation", *American Geophysical Union Annual Meeting*, 2004.
Planetary Geology & Geophysics (PGG) review panel, 2002, 2003.
Session Chair, "Mars Tectonics", *Lunar & Planetary Science*, 2002.

Honors and Awards

NASA Exceptional Achievement Medal (2014)
NASA Group Achievement Award – MSL Science Office Development and Operations Team, 2013
NASA Group Achievement Award – MSL Surface Sampling and Science Systems Team, 2013
MSL SASPaH Development Award, 2013
NASA Software of the Year Award, 2012.
Spot Award – AEGIS, 2011.
Mariner Bonus – Mars Science Laboratory, SASPaH, 2011
Mariner Bonus – Mars Science Laboratory, 2007
Spot Award – Mars Science Laboratory, 2006
Team Bonus Award, OASIS Team, 2005
Spot Award – Mars Exploration Rover, 2004.
NASA Group Achievement Award –MER Operations, 2004.
NASA Group Achievement Award –MER Planning, 2003.
NASA Group Achievement Award –MER Science Operations, 2003.
NASA Group Achievement Award –MPF Operations, 1997.
NASA Group Achievement Award –MPF Science, 1997.

Professional Journal Reviewer

Journal of Geophysical Research-Planets
Icarus
Geology
Geological Society of America Bulletin

Professional Affiliations

Geological Society of America –Past Chair - Planetary Science Division, 2014

Geological Society of America –Chair - Planetary Science Division, 2013
Geological Society of America – First Vice Chair - Planetary Science Division, 2012
Geological Society of America – Second Vice Chair - Planetary Science Division, 2011
Geological Society of America – Secretary Treasurer Planetary Science Division, 2008-2010
American Geophysical Union

Publications-Journal Articles

G. H. Peters, E. M. Carey, **R. C. Anderson**, W. J. Abbey, R. Kinnett, J. A. Watkins, M. Schemel, M. O. Lashore, M. D. Chasek, W. Green, L.W. Beegle, and A.R. Vasavada, Uniaxial Compressive Strengths of Rocks Drilled at Gale Crater, Mars. *Geophysical Research Letters*, Vol. 45, Issue 1, pg. 108-116, DOI: 10.1002/2017GL75965., 15 January 2018.

R. C. Anderson, J.M. Dohm, T.M. Hare S. J. Robbins, J. Schroeder, Geologic Map of the Memnonia-Sirenum: 1-5,000,000-scale, *submitted to the USGS Mappers Program for review*. 6/2015.

R. C. Anderson, J.M. Dohm, T.M. Hare S. J. Robbins, J.-P. Williams, H. Miyamoto, R. Hemmi, T. Niihara, G. Komatsu, A. Fairén, B. Hynek, J. Schroeder, S. Maruyam, Geologic History of the Memnonia-Sirenum Region, Mars, *revision*, 1/2017.

R. C. Anderson, L. W. Beegle, J. Hurowitz, C. Hanson, W. Abbey, C. Sybold, D. Liminodi, S. Kuhn, L. Jandura, K. Brown, G. Peters, C. Roumeliotis, M. Robinson, J. Grotzinger, The Mars Science Laboratory scooping campaign at Rocknest; a comparison between Pre-launch Terrestrial Testing and Mars, *Icarus* (2015), pp. 66-77; DOI information: 10.1016/j.icarus.2015.03.033.

R. C. Anderson, L. Jandura, A.B. Okon, D. Sunshine, C. Roumeliotis, L. Beegle, J. Hurowitz, B. Kennedy, D. Limonadi, S. McCloskey, M. Robinson. C. Seybold, K. Brown¹, J. Crisp, Collecting Powdered Samples in Gale Crater, Mars; An Overview of the Mars Science Laboratory Sample Acquisition, Sample Processing and Handling System, *Space Sci. Rev.*, (2012) 170:57-75, DOI 10.1007/s11214-012-9898-9.

Nesnas, I. A.D., J. Matthews, P. Abad-Manterola, J. Burdick, J. Edlund, J. Morrison, R. Peters, M. Tanner, R. Miyake, B. Solish, and **R. C. Anderson**, (2012) Axel and DuAxel Rovers for the Sustainable Exploration of Extreme Terrains, *Jour. of Field Robotics*, 1-23, DOI: 10.1002/rob.21407.

Fairén, A. G., J. M. Dohm, V. R. Baker, S. D. Thompson, W. Mahaney, K. E. Herkenhoff, J. A. P. Rodríguez, A. F. Davila, D. Schulze-Makuch, R. Elmaarry, E. R. Uceda, R. Amils, H. Miyamoto, K. Kim, **R. C. Anderson** and C. P. McKay (2011). Meteorites at Meridiani Planum provide evidence for significant amounts of surface and near-surface water on early Mars. *Meteoritics & Planetary Science*, 46 (12), 1832-1841.

Dohm, J.M., Miyamoto, H., Ori, G.G., Fairén, A.G., Davila, A.F., Komatsu, G., Mahaney, W.C., Williams, J.-P., Joye, S.B., Di Achille, G., Oehler, D.Z., Marzo, G.A., Schulze-Makuch, D., Acocella, V., Glamoclija, M., Pondrelli, M., Boston, P., Hart, K.M., **Anderson, R.C.**, Baker, V.R., Fink, W., Kelleher, B.P., Furfaro, R., Gross, C., Hare, T.M., Frazer, A.R., Ip, F., Allen, C.C.R., Kim, K.J., Maruyama, S., McGuire, P.C., Netoff, D., Parnell, J., Wendt, L., Wheelock, S.J., Steele, A., Hancock, R.G.V., Havics, R.A., Costa, P., and Krinsley, D. (2011). An inventory of potentially habitable environments on Mars: Geological and biological perspectives. In Garry, W.B., and Bleacher, J.E., eds., *Analogs for Planetary Exploration. Geological Society of America Special Paper* 483, p. 317–347, doi:10.1130/2011.2483(21).

Anderson R. C., L. W. Beegle, Gregory H. Peters, G. Fleming, L.Jandura, K. Kriechbaum, K. Manatt, A. Okon, E. Ponders, L. Sollitt, and D. Sunshine (2009). Particle Transport and Distribution on the Mars Science Laboratory Mission: Effects of Triboelectric charging. *Icarus* 204, 545-557 doi:10.1016/j.icarus.2009.07.006.

Beegle, L.W., G. H. Peters, **R. C. Anderson**, R. Bhartia, A. G. Ball, and L. Sollitt (2009). Particle Sieving and Sorting Under Simulated Martian Conditions. *Icarus* 204, 687-696 doi:10.1016/j.icarus.2009.07.008

J.M. Dohm, **R. C. Anderson**, J.-P. Williams, J. Ruiz, P.C. McGuire, D.L. Buczkowski, J.C. Ferris, R. Wang, H. Miyamoto, T.M. Hare, J.E.P. Connerney, V.R. Baker, "Claritas Rise, Mars: Pre-Tharsis Magmatism?", *J. Volcanology and Geothermal Research*, Vol. 185, Issues 1-2, pp. 139-156 (2009).

J. M. Dohm, J.-P. Williams, **R. C. Anderson**, J. Ruize, P. C. McGuire, G. Komatsu, A. F. Davila, J. C. Ferris, D. Schulze-Makuch, V. R. Baker, W. V. Boynton, A. G. Fairén, T. M. Hare, H. Miyamoto, K. L. Tanaka and S. J. Wheelock, New evidence for a magmatic influence on the origin of Valles Marineris, Mars, *Jour. of Volcanology and Geothermal Res.*, Vol. 185, Issues 1-2, pp. 12-27, doi:10.1016/j.jvolgeores.2008.11.029, (2008).

Anderson, R. C., J. M. Dohm, A.F.C. Haldemann, E. Pounders, M. Golombek, and A. Castano, Centers of tectonic activity for the Eastern Hemisphere of Mars, *Icarus*, vol. 195, #2, 537-546, (June, 2008), doi:10.1016/j.icarus.2007.12.027.

G. H. Peters, W. Abbey, G. S. Mungas, G. H. Bearman, J. A. Smith, S. Douglas, **R. C. Anderson**, L. W. Beegle, Mojave Mars Simulant -- a New Martian Soil Simulant, *Icarus*, Vol. 197, #2, 470-479, 10/2008, doi:10.1016/j.icarus.2008.05.004.

N. A. Cabrol, K. E. Herkenhoff, R. Greeley, E. A. Grin, C. Schröder, C. d'Uston, C. Weitz, A. R. Yingst, J. Moore, A. Knudson, B. Franklin, and **R. C. Anderson**, Soil Sedimentology at Gusev Crater From Landing to Present" *accepted JGR*, 4/2008.

Seshadri, S., K. B. Chin, M. G. Buehler and **R. C. Anderson**, Using Impedance Spectroscopy to Survey the Water Content of Planetary Regoliths (AST-2007-0161) *Astrobiology*, 8(4), 781-792, August, 2008.

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Dohm, J. M., **R. C. Anderson**, V.R. Baker, N.G. Barlow, W.V. Boynton, A.G. Davies, A.G. Fairén, J.C. Ferris, M. Glamoclija, J. Keller, K. Kerry, L. Marinangeli, H. Miyamoto, G. Ori, J.A.P. Rodríguez, D. Schulze-Makuch, R.G. Strom, J. Taylor, M.A. de Pablo Hdez, Tharsis/Elysium Corridor: A Marker for an Internally Active Mars?, *accepted Planetary Rev.*, 2007.

Dohm, J. M., V. R. Baker, S. Maruyama, and **R.C. Anderson**, (2007) Traits and Evolution of the Tharsis Superplume, Mars, in *Superplumes*, D. A. Yuen et al., (eds.), 523-536.

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K. R. Kuhlman, W. G. Fusco, M. T. La Duc, L. B. Allenbach, C. L. Ball, G. M. Kuhlman, **R. C. Anderson**, I. K. Erickson, T. Stuecker, J. Benardini, J. L. Strap, and R. L. Crawford, Diversity of Microorganisms within Rock Varnish in the Whipple Mountains, California, *Applied Environmental Microbiology* 2006 February; 72(2): 1708–1715. doi: 10.1128/AEM.72.2.1708-1715.2006.

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Weitz, C.M., **R. C. Anderson**, J.F. Bell III, W.H. Farrand, K.E. Herkenhoff, J.R. Johnson, B.L. Jolliff, R.V. Morris, S.W. Squyres, and R.J. Sullivan. Soil grain analyses at Meridiani Planum, Mars. *J. Geophys. Res.* 111, 1-26, doi:10.1029/2005JE002541, (2006).

Arvidson, R.E., S.W. Squyres, **R. C. Anderson**, J.F. Bell III, D. Blaney, J. Brückner, N.A. Cabrol, W.M. Calvin, M.H. Carr, P.R. Christensen, B.C. Clark, L. Crumpler, D.J. Des Marais, P.A. de Souza Jr., C. d'Uston, T. Economou, J. Farmer, W.H. Farrand, W. Folkner, M. Golombek, S. Gorevan, J.A. Grant, R. Greeley, J. Grotzinger, E. Guinness, B.C. Hahn, L. Haskin, K.E. Herkenhoff, J.A. Hurowitz, S. Hviid, J.R. Johnson, G. Klingelhöfer, A.H. Knoll, G. Landis, C. Leff, M. Lemmon, R. Li, M.B. Madsen, M.C. Malin, S.M. McLennan, H.Y. McSween, D.W. Ming, J. Moersch, R.V. Morris, T. Parker, J.W. Rice Jr., L. Richter, R. Rieder, D.S. Rodionov, C. Schröder, M. Sims, M. Smith, P. Smith, L.A. Soderblom, R. Sullivan, S.D. Thompson, N.J. Tosca, A. Wang, H. Wänke, J. Ward, T. Wdowiak, M. Wolff, and A. Yen, Overview of the Spirit Mars Exploration Rover Mission to Gusev Crater: Landing site to Backstay Rock in the Columbia Hills, *J. Geophys. Res.*, *111*, E02S01, doi:10.1029/2005JE002499, 2006.

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Herkenhoff, Ken E.; Squyres, Steve W.; **Anderson, Robert**; Archinal, Brent A.; Arvidson, Raymond E.; Barrett, Janet M.; Becker, Kris J.; Bell, James F., III; Budney, Charles; Cabrol, Nathalie A.; Chapman, Mary G.; Cook, Debbie; Ehlmann, Bethany L.; Farmer, Jack; Franklin, Brenda; Gaddis, Lisa R.; Galuszka, Donna M.; Garcia, Patricia A.; Hare, Trent M.; Howington-Kraus, Elpitha; Johnson, Jeffrey R.; Johnson, Sarah; Kinch, Kjartan; Kirk, Randolph L.; Lee, Ella Mae; Leff, Craig; Lemmon, Mark; Madsen, Morten B.; Maki, Justin N.; Mullins, Kevin F.; Redding, Bonnie L.; Richter, Lutz; Rosiek, Mark R.; Sims, Michael H.; Soderblom, Laurence A.; Spanovich, Nicole; Springer, Richard; Sucharski, Robert M.; Sucharski, Tracie; Sullivan, Rob; Torson, James M.; Yen, Albert, Overview of the Microscopic Imager Investigation during Spirit's first 450 sols in Gusev crater. *J. Geophys. Res.*, Vol. 111, No. E2, E02S04, 10.1029/2005JE002574, 2006.

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R. E. Arvidson, **R. Anderson**, P. Bartlett, J. Bell, D. Blaney, P. Christensen, P. Chu, L. Crumpler, K. Davis, B.L. Ehlmann, R. Fergason, M. P. Golombek, S. Gorevan, J. Grant, R. Greeley, E. Guinness, A. F. C. Haldemann, K. Herkenhoff, J. Johnson, G. Landis, R. Li, R. Lindemann, H. McSween, D.W. Ming, T. Myrick, L. Richter, F.P. Seelos, S. W. Squyres, R. Sullivan, A. Wang, J. Wilson, Initial Localization and Physical Properties Experiments Conducted With the Mars Exploration Rover Mission to Gusev Crater., Localization and Physical Property Experiments Conducted by Spirit at Gusev Crater, *Science*, v. 305, p. 821-824, August, 2004.

R. Gellert, R. Rieder, **R. C. Anderson**, J. Bruckner, B. Clark, G. Dreibus, T. Economou, G. Klingelhofer, G. Lugmair, D. Ming, S. Squyres, C. d'Uston, H. Wanke, A. Yen, J. Zipfel, Chemistry of Rocks and Soils in Gusev Crater from the Alpha Particle X-ray Spectrometer, *Science*, v. 305, p. 829-832, August, 2004.

R. Rieder, R. Gellert, **R. C. Anderson**, J. Bruckner, B. Clark, G. Dreibus, T. Economou, G. Klingelhofer, G. Lugmair, D. Ming, S. Squyres, C. d'Uston, H. Wanke, A. Yen, J. Zipfel, Chemistry of Rocks and Soils at Meridiani Planum from the Alpha Particle X-ray Spectrometer, *Science*, v. 306, p. 1747-1749, December, 2004.

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