Tomasz F. Stepinski

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EDUCATION

Ph.D., Applied Mathematics, University of Arizona, Tucson, Arizona. 1986
Dissertation topic: *Magnetohydrodynamic Dynamo Action in Disc-Like Astrophysical Bodies*
Magister (Master of Science), Astrophysics, Warsaw University, Poland. 1979
Dissertation topic: *A Model of Light Variations of Be Stars*

PRESENT RESEARCH CONCENTRATION

Computational geomorphometry and space informatics: machine cataloging of impact craters, automatic mapping of valley networks on Mars and drainage networks on Earth; *terrain analysis, machine learning, mathematical morphology, image processing.*

Automated computer cartography and map comparison: regional and global geomorphic auto-mapping of Martian surface and quantitative map comparison*; supervised and unsupervised machine learning, segmentation, classification, normalized mutual information, Kolmogorov complexity.*

Intelligent data analysis: discovering drivers of change in spatial systems, discovery of feature-based hot spots in spatial databases, validation of models; *spatial data mining, spatial collocation, association analysis, data mining, change analysis*

PREVIOUS RESEARCH INTEREST

Statistical analysis in planetary science and astronomy: extrasolar planets, binaries, Kuiper belt objects; *expectation-maximization (EM) algorithm, genetic algorithms.*

Models of protoplanetary disks: evolution of solids in protoplanetary disks, architecture and diversity of planetary systems*; numerical solutions of partial differential equations.*

Magnetohydrodynamics: magnetic field generation in solar nebula and accretion disks, angular momentum transport; *numerical solutions of partial differential equations.*

EMPLOYMENT HISTORY

Lunar and Planetary Institute, Houston, TX. 1990 – present
Staff Scientist

University of Arizona, Dept. of Planetary Sciences, Tucson, AZ. 1986 –1990
Research Associate

University of Arizona, Dept. of Planetary Sciences, Tucson, AZ. 1980 –1986
Research Assistant

Copernicus Astronomical Center, Polish Academy of Sciences, Poland. 1979 – 1980
Research Specialist

RECENT RESEARCH GRANTS

FUNDED (bold dates indicate active grants)

Co-PI (with Co-PI Ricardo Vilalta at University of Houston). *Automatic Geomorphic Mapping and Analysis of Land Surfaces Using Pattern Recognition*. NSF – Information Integration & Informatics ($443,450). **09/01/08 – 08/31/11**.

PI (with Co-I Wei Ding at University of Massachusetts Boston). Automated Detection of Sub-kilometer Craters in High Resolution Planetary Images. NASA – Applied Information Systems Research Program ($285,163). **09/01/09 – 08/31/12**.

PI (with Co-PI Ricardo Vilalta at University of Houston). Automated Identification and Characterization of Landforms on Mars. NASA – Applied Information Systems Research Program ($219,585). **03/15/06 – 03/14/10**.

Co-I (with PI Wei Luo at Northern Illinois University). *Global GIS Database of Drainage on Mars*. NASA – Mars Data Analysis Program ($128,699 for T. Stepinski). **05/16/08 – 05/15/11**.

Co-PI (with Co-PI Ricardo Vilalta at University of Houston). *A Statistical-Learning Tool for the Analysis and Characterization of Mars Topography*. NSF – Information Integration & Informatics ($225,000 for T. Stepinski). 09/01/04 – 08/31/08.

PI *Origin of Martian Valley Networks – A Computational Approach.* NASA – Mars Fundamental Research Program ($152,551). 07/01/05 – 06/30/08.

Co-I (with PI Wei Ding at University of Massachusetts Boston) *Computer-Aided Detection of Sub-Kilometer Craters in High Resolution Planetary Images*. University of Houston-Clear Lake Institute for Space Systems Operations (ISSO) ($7,686.25). Summer 2008.

PENDING

Co-PI (with Co-PI Wei Ding at University of Massachusetts Boston). *Discovering Drivers of Change in Spatial Systems Through Association Pattern Mining.* NSF – Information Integration & Informatics ($247,710 for T. Stepinski). 08/01/10 – 07/31/13.

Co-PI (with Co-PI Wei Luo at Northern Illinois University). *Understanding Nonuniform Dissection Through Morphology-Based Mapping and Spatial Change Analysis*. NSF – Geomorphology and Land Use Dynamics. ($237,362), 09/01/10 - 08/31/13.

PROFESSIONAL MEMBERSHIP & SERVICE

SOCIETIES:
American Astronomical Society
International Astronomical Union
American Geophysical Union
IEEE Geoscience and Remote Sensing Society

SERVE ON REVIEW PANELS:
NASA Origin of Solar Systems Program
NASA Mars Fundamental Research Program
NSF Science and Engineering Information Integration and Informatics

REVIEW FOR JOURNALS:
Journal of Geophysical Research
Geophysical Research Letters
International Journal of Geographical Information Science
IEEE Transactions on Geoscience and Remote Sensing
IEEE Geoscience and Remote Sensing Letters
Computers & Geosciences
Geomorphology
Icarus
Planetary and Space Science
Astrophysical Journal
Astronomy & Astrophysics
Monthly Notices of the Royal Astronomical Society
Landscape and Urban Planning

REVIEW FOR CONFERENCES:
Lunar and Planetary Science Conference
International Geoscience and Remote Sensing Symposium

REVIEW PROPOSALS FOR:
NSF Science and Engineering Information Integration and Informatics

NASA Mars Fundamental Research Program
NASA Mars Data Analysis Program
NASA Planetary Geology & Geoscience Program
NASA Origin of Solar Systems

POSTDOCTORAL FELLOWS AND GRADUATE STUDENTS SUPERVISED

Josue Salazar 2008 - 2010
Project title: *Discovering drivers of change in spatial systems*.

Lourenco Bandeira 2009 - 2010
Project title:.*Automatic Identification of Sub-km Craters in High Resolution Planetary Images.*

Chaitanya Bagaria 2008 - 2009
Project title:.*Automatic Mapping of Martian Physiography*.

Dr. Erik Urbach 2007 - 2008
Project title: *Automatic Identification of Small Craters on Mars from Images using Mathematical Morphology*.

Wei Ding 2007 - 2008
Project title: *Data Mining Global Datasets on Mars*.

Soumya Ghosh 2005-2007
Master dissertation title: *A Machine Learning Approach for Automated Geomorphic Map Generation*.

Brian Bue 2004-2006
Projects title: *Automated classification of Landforms on Mars; Automatic Identification of Craters on Mars*.

Ian Molloy 2004-2005
Project title: *Automated Mapping of Valley Networks on Mars*.

Martin Collier 2002-2003
Project title: *Mapping and Characterizing Valley Networks on Mars*.

Dr. Herve Gregoire-Mazzocco 2002-2005
Project title: *Meanders on Mars.*

William J. O'Hara IV 2002-2003
Master dissertation title: *Drainage Analysis of Noachian Martian Valley Networks*.

Dr. Kacper Kornet 2000-2004

Project title: *Diversity of planetry systems*

Dimitrios Stamatellos 1999-2000
Project title: *Infrared Excesses From Accretion Streams in Pre-Main-Sequence Binaries*.

Dr. Mauricio Reyes-Ruiz 1992-1995
Ph.D. dissertation title: *Magnetic Fields in Protoplanetary Disks*.

PUBLICATIONS

Recent peer-reviewed papers (since 2002)

- **T. F. Stepinski**, (2010) Classifying patterns of land cover using mutual information and clustering,
- submitted to 2010 IGARSS.
- W. Luo, and **T. F. Stepinski** (2010) Extracting Streams from DEM using Terrain Openness, submitted to Computers & Geosciences.
- J. Lasue, **T.F. Stepinski**, S.W. Bell (2010) Automated Classification of Interplanetary Dust Particles: JSC Cosmic Dust Catalog Volume 15, submitted to meteoritics and Planetary Science.
- **T. F. Stepinski** and R. Vilalta (2010) Machine Learning Tools for Geomorphic Mapping of Planetary Surfaces, chapter to appear in a book *Machine Learning* ISBN 978-953-7619-X-X.
- **T. F. Stepinski**, W. Ding, C. F. Eick (2010) Controlling Patterns of Geospatial Phenomena, accepted to *GeoInformatica*.
- S. Ghosh and **T. F. Stepinski** and R. Vilalta (2010) Automatic Annotation of Planetary Surfaces with Geomorphic Labels, IEEE Transactions on Geoscience and Remote Sensing, 48(1), p175-185.
- W. Luo, and **T. F. Stepinski**, (2009) Computer-Generated Global Map of Valley Networks on Mars, J. Geophys. Res., 114, E11010.
- **T. F. Stepinski**, and C. Bagaria (2009) Segmentation-Based Unsupervised Terrain Classification for Generation of Physiographic Maps, IEEE Geoscience and Remote Sensing Letters., 6(4), p733-737.
- **T. F. Stepinski** and C. Bagaria (2009) A Two-Stage Classification Approach for Effective Geomorphic Mapping of Planetary Surfaces from DEM Data. In proceedings of *Geomorphometry 2009* .
- E. R. Urbach, **T. F. Stepinski** (2009) Automatic Detection of Sub-Kilometer Craters in High Resolution Planetary Images, Planetary and Space Science, 57(4), p880-887.
- W. Luo, X. Li, **T. F. Stepinski**, L. Di, (2009) Web Service for Extracting Terrain Openness. In proceedings of *17th International Conference on Geoinformatics*, DOI: 0.1109/GEOINFORMATICS.
- W. Ding, **T. F. Stepinski**, R. Parmar, D. Jiang, C. F. Eick, (2009) Discovery of feature-based hotspots using supervised clustering, Computers and Geosciences 25(7), p1508-1516.
- **T. F. Stepinski**, M. P. Mendenhall, and B. D. Bue (2009) Machine Cataloging of Impact Craters on Mars. Icarus, 203, p.77-87.
- W. Ding, **T.F. Stepinski**, J. Salazar (2009) Discovery of Geospatial Discriminating Patterns from Remote Sensing Datasets. In Proceedings of SIAM International Conference on Data Mining (SDM), Nevada, April 2009.
- W. Luo, X. Li, I Molloy, and **T.F. Stepinski** (2008) Web Service for Extracting Stream Networks from DEM Data. In Proceedings of 16th International Conference on Geoinformatics, June 28-29 Guangzhou, China.
- R. Vilalta and **T.F. Stepinski** (2008) Pattern Validation in Machine Learning: A Case Study in Planetary Science. In Encyclopedia of Data Warehousing and Mining – Second Edition, J. Wang Edt. IGI Global.
- **T.F. Stepinski**, W. Ding and C. F. Eick (2008) Discovering Controlling Factors of Geospatial Variables by Mining Emerging Patterns. In proceedings of 16th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD), Las Vegas, Nevada, August 2008.
- C. F. Eick, R. Parmar, W. Ding, **T.F. Stepinski**, and J.-P. Nicot (2008) Finding Regional Co-location Patterns for Sets of Continuous Variables, in Proceedings of 16th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD), Las Vegas, Nevada, August 2008.
- W. Ding, R. Jiamthapthaksin, R. Parmar, D. Jiang, **T.F. Stepinski**, and C. F. Eick (2008) Towards Region Discovery in Spatial Datasets, In Proc. Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD), Osaka, Japan, May 2008. Lecture Notes in Computer Science Vol. 5012, p.88-99.
- W. Luo and **T.F. Stepinski** (2008) Identification of Geologic Contrast from Landscape Dissection Pattern: An Application to the Cascade Range, Oregon, USA. Geomorphology, 90, p90-98.
- **T.F. Stepinski**, R. Vilalta, S. Ghosh (2007) Machine Learning Tools for Automatic Mapping of Martian Landforms. IEEE Intelligent Systems Nov 2007. pp. 100-106.
- **T. F. Stepinski**, S. Ghosh, and R. Vilalta (2007) Machine Learning for Automatic Mapping of Planetary Surfaces. In Proceedings of Nineteenth Innovative Applications of Artificial Intelligence Conference, July 24-26, 2007, Vancouver, British Columbia.

- **T. F. Stepinski** and E. R. Urbach (2007) Mapping craters depths in Terra Cimmeria, Mars: Implications for spatial distribution of ground ice. 7th International Conference on Mars, July 9-13, Pasadena, California
- B. W. Luo, **T. F. Stepinski**, and R. Y. Qi (2007) Drainage Density and Controlling Factors in Cascade Range, Oregon, USA. To appear in proceedings of Geoinformatics 2007, May 26-28, 2007, Nanjing, China
- B. I. Molloy and **T.F. Stepinski** (2007) Automated Mapping of Valley Networks on Mars. Computers and Geoscience, 33, p728-738.
- B. D. Bue and **T.F. Stepinski** (2007) Machine Detection of Martian Impact Craters from Digital Topography Data. IEEE Transactions on Geoscience and Remote Sensing, 45(1), p.265-274
- R, Vilalta, **T.F. Stepinski**, and M. Achari (2007) An Efficient Approach to External Cluster Assessment with an Application to Martian Topography. Data Mining and Knowledge Discovery, 14(1), p.1-23.
- **T. F. Stepinski**, S. Ghosh, and R. Vilalta (2006) Automatic Recognition of Landorms on Mars Using Terrain Segmentation and Classification. In Lecture Notes in Artificial Intelligence, 4265, p 255-266
- W. Luo and **T. F. Stepinski** (2006) Topographically Derived Maps of Valley Networks and Drainage Density in the Mare Tyrrhenum quadrangle on Mars. Geophysical Research Letters, 33, L18202.
- B. D. Bue and **T.F. Stepinski** (2006) Automated Classification of Landforms on Mars. Computers and Geoscience, 32, p.604-614.
- **T.F. Stepinski** and A.P. Stepinski (2005) Morphology of Drainage Basins as an Indicator of Climate on Early Mars. J. Geophys. Res., 110, E12S12.
- **T.F. Stepinski** and R. Vilalta (2005) Digital Topography Models for Martian Surfaces. IEEE Geoscience and Remote Sensing Letters, 2(3), p.260-264.
- K. Kornet, P. Bodenheimer, M. Rozyczka, **T.F. Stepinski** (2005) Formation of giant planets in disks with different metallicities. Astronomy & Astrophysics, 430, 1133
- R. Vilalta, **T. F. Stepinski**, M. Achari, and F. Ocegueda-Hernandez (2004) A Quantification of Cluster Novelty with an Application to Martian Topography. In Lecture Notes in Artificial Intelligence, 3202, p 434-445
- M. Rozyczka, K. Kornet, P. Bodenheimer, **T.F. Stepinski** (2004) Global evolution of solids in protoplanetary disk: A simple model. Rev. Mexicana de Atronom. Astrofisica, 22, 91.
- **T. F. Stepinski** and S. Coradetti (2004) Comparing morphologies of drainage basins on Mars and Earth using integralgeometry and neural maps. Geophysical Research Letters, 31(15), L15604
- **T. F. Stepinski** and M. L. Collier (2004) Extraction of Martian Valley Networks from Digital Topography. J. Geophys. Res., 109, E11005
- K. Kornet, M. Rozyczka, **T.F. Stepinski** (2004) An Alternative look at the Snowline in Protoplanetary Disks. Astronomy & Astrophysics, 417, 151
- **T. F. Stepinski**, M. L. Collier, P. J. McGovern, S. M. Clifford (2004) Martian Geomorphology from Fractal Analysis of Drainage Networks. J. Geophys. Res., 109, E02995
- **T. F. Stepinski**, M. M. Marinova, P. J. McGovern, S. M. Clifford (2002) Fractal Analysis of Drainage Basins on Mars. Geophysical Research Letters, 29(8), 30-1.
- M. A. McGrath, E. Nolan, D. C. Black, G. Gatewood, K. Noll, A. Schultz, S. Lubow, I. Han, **T. F. Stepinski**, T. Targett (2002) An upper limit to the mass of the radial velocity companion to rho Cancri. Astrophysical Journal, 564, L27

Older peer-reviewed papers (before 2002)

- K. Kornet, **T. F. Stepinski** and M. Rozyczka (2001) Diversity of Planetary Systems from Evolution of Solids in Protoplanetary Disks. Astronomy & Astrophysics, 378, 180.
- **T. F. Stepinski** and D. C. Black (2001) On Orbital Elements of Extrasolar Planetary Candidates and Spectroscopic Binaries. Astronomy & Astrophysics, 371, 250.
- **T. F. Stepinski**, R.Malhotra and D. C. Black (2000) The Upsilon Andromedae System: Models and Stability. Astrophysical Journal, 545, 1044.
- **T. F. Stepinski** and D. C. Black (2000) Statistics of Low-mass companions to Stars: Implications for Their Origin. Astronomy & Astrophysics, 356, 903.
- D. C. Black and **T. F. Stepinski** (2000) On the Nature and Origin of Low-mass Companions to Stars: A Statistical Perspective. In From Giant Planets to Cool Stars, ASP Conference Series, Vol 212. (C. Griffith and M. Marley Eds), 54.
- **T. F. Stepinski** and D. C. Black (2000) Populational Similarities Between Low-mass and Stellar Companions to Solar-type Stars. In Birth and Evolution of Binary Stars, poster proceedings of IAU Symposium 200 (B. Reipurth and H. Zinnicker Eds), p 167.
- M. Reyes-Ruiz and T. F. Stepinski (1999) An $\alpha\Omega$-Dynamo in Accretion Disks with Force-free Coronae. Astronomy & Astrophysics, 342, 892.
- **T. F. Stepinski** (1998) New Approach to Diagnosing properties of Protoplanetary Disks. Astrophysical Journal, 507, 361.
- **T. F. Stepinski** (1998) The solar nebula as a process – an analytic model. Icarus, 132, 100.
- **T. F. Stepinski** (1998) Evolving protoplanetary disks: Linking theory to observations. In Planetary systems: the long view (L. M. Celnikier and J. Tran Thanh Van Eds.) p. 59. Editions Frontiers.
- P. Valageas and **T. F. Stepinski** (1998) Evolution of solids in turbulent protoplanetary disks. In Planetary systems: the long view (L. M. Celnikier and J. Tran Thanh Van Eds.) p. 59. Editions Frontiers.
- **T. F. Stepinski** and Valageas P. (1997) Global evolution of solid matter in turbulent protoplanetary disk II. Development of Icy Planetesimals. Astronomy & Astrophysics, 319, 1007
- M. Reyes-Ruiz and **T. F. Stepinski** (1997) Accretion Discs Dynamos in the Presence of an External Magnetic Field. Monthly Notices of the Royal Astronomical Society, 285, 501

- M. Reyes-Ruiz and **T. F. Stepinski** (1996) Axisymmetric Two-Dimensional Computation of Magnetic Field Dragging in Accretion Disks. Astrophysical Journal, 459, 653
- **T. F. Stepinski** and Valageas P. (1996) Global evolution of solid matter in turbulent protoplanetary disk I. Aerodynamics of solid particles. Astronomy & Astrophysics, 309, 301.
- **T. F. Stepinski** and Valageas P. (1996) The global perspective on the evolution of solids in a protoplanetary disk. In From Dust to Planetesimals: Contributed Papers (M. E. Kress et al. Eds.) p. 187. NASA Conference Publication 3343.
- G. Rudiger, D. Elstner, and **T. F. Stepinski** (1995) The Standard Accretion Disk Dynamo. Astronomy & Astrophysics, 298, 934
- M. Reyes-Ruiz and **T. F. Stepinski** (1995) Evolution of Magnetized Protoplanetary Disks. The Astrophysical Journal, 438, 750.
- **T. F. Stepinski** and M. Reyes-Ruiz (1995) Magnetically-Aided Evolution of Protoplanetary Disks. In Circumstellar Matter 1994 (G.D. Watt and P.M. Williams Eds.) p. 565. Kluwer Academic Publishers.
- **T. F. Stepinski** (1995) Character and Evolution of Magnetic Fields in Protoplanetary Disks Revista Mexicana de Astronomia y Astrofisica (Serie de Conferencias), 1, 267.
- M. Reyes-Ruiz and **T. F. Stepinski** (1995) Can α-Disks Drive Winds Centrifugally Revista Mexicana de Astronomia y Astrofisica (Serie de Conferencias), 3, 97
- A. Z. Dolginov and **T. F. Stepinski** (1994) Are Cosmic Rays Effective for Ionization of Protoplanetary Disks? The Astrophysical Journal 427, 377
- A. Z. Dolginov and **T. F. Stepinski** (1993) On Quasiperiodic Variation of Pulsars' Periods: An Alternative to the Planetary Interpretation of PSR1257+12, in Planets Around Pulsars,(J.A. Phillips, S.E. Thorsett, and S.R. Kulkarni, Eds.), p61. Astronomical Society of Pacific.
- **T. F. Stepinski** (1993) On Magnetic Dynamo in Thin Accretion Disks Around Compact and Young Stars. In Solar and Planetary Dynamos (M.R.E. Proctor et al. Eds.) p. 287. Cambridge University Press.
- **T. F. Stepinski** (1993) Kinematic Dynamo in Turbulent Circumstellar Disks. In The Cosmic Dynamo (F. Krause et al. Eds.) p. 203. Kluwer Academic Publishers.
- **T. F. Stepinski**, M. Reyes-Ruiz, and H.A.T. Vanhala (1993) Solar nebula Magnetohydrodynamic Dynamos: Kinematic Theory, Dynamical Constraints, and Magnetic Transport of Angular Momentum. Icarus, 106, 77.
- **T. F. Stepinski** (1992) Precesja - Tak! Planety - Nie!, Postepy Astronomii, 40, p58. (in Polish)
- **T. F. Stepinski** (1992) Generation of Dynamo Magnetic Fields in the Primordial Solar Nebula, Icarus, 97, p130.
- W. R. Stoeger, A. G. Pacholczyk, and **T. F. Stepinski** (1992) Active Galactic Nuclei. IV. Supplying Black Hole Clusters by Tidal Disruption and by Tidal Capture of Stars. The Astrophysical Journal, 391, p550.
- W. R. Stoeger, A. G. Pacholczyk, and **T. F. Stepinski** (1992) On the Luminosity of a Black Hole Model of Active Galactic Nuclei. AIP Conference Proceedings 254: Testing the AGN Paradigm, (S.S. Holt, S.G. Neff, and C.M. Urry, Eds.). p61.
- **T. F. Stepinski** (1991) Dynamo Magnetic Field Generation in Turbulent Accretion Disks. Publication of the Astronomical Society of the Pacific, 103, p777.
- **T. F. Stepinski** and E. H. Levy (1991), Dynamo Magnetic Field Modes in Thin Astrophysical Disks: An Adiabatic Computational Approximation, The Astrophysical Journal, 379, p343.
- **T. F. Stepinski** and E. H. Levy (1990), Generation of Dynamo Magnetic Fields in Thin Keplerian Disks, The Astrophysical Journal, 362, p318.
- **T. F. Stepinski** and E. H. Levy (1990), Dynamo - Magnetic - Field Induced Angular Momentum Transport in Protostellar Nebulae: The Minimum Mass Protosolar Nebulae. The Astrophysical Journal, 350, p819.
- A. G. Pacholczyk, **T. F. Stepinski**, and W. R. Stoeger (1989), Active Galactic Nuclei. III. Accretion Flow Regimes in an Externally Supplied Cluster of Black Holes. The Astrophysical Journal, 343, p563.
- **T. F. Stepinski** and E. H. Levy (1988), Generation of Dynamo Magnetic Fields in Protoplanetary and Other Astrophysical Disks, The Astrophysical Journal, 331, p416.
- A. G. Pacholczyk and **T. F. Stepinski** (1988), Active Galactic Nuclei. II. Acceleration of Relativistic Particles in a Cluster of Accreting Black Holes, The Astrophysical Journal, 324, p695.
- **T. F. Stepinski** (1980), A Model of Light Variation of Be Stars. Acta Astronomica, Vol.30, No4, p413

Lunar and Planetary Science Conference (LPSC) papers

- **T.F. Stepinski** (2010) Geographical Distribution of Crater Depths on Mars. In 41th Lunar and Planetary Science Conference, Abstract#1845.
- **T.F. Stepinski** and W. Luo (2010) Global Pattern of Dissection on Mars and the Northern Ocean Hypothesis. In 41th Lunar and Planetary Science Conference, Abstract#1350.
- L. Bandeira ,Wei Ding and **T. F. Stepinski** (2010) Automatic Detection of Sub-km Craters Using Shape and Texture Information. In 41th Lunar and Planetary Science Conference, Abstract#1144.
- S. W. Bell, J. Lasue, and **T.F. Stepinski** (2010). Automated Classification of Stratospheric Dust. In 41th Lunar and Planetary Science Conference, Abstract#2622.
- J. Lasue, and **T.F. Stepinski,** S. W. Bell, (2010). Automated Classification of Interplanetary Dust Particles. In 41th Lunar and Planetary Science Conference, Abstract#2045.
- **T. F. Stepinski** and Chaitanya Bagaria (2009) Automatic Mapping of Martian Physiography: Application to Tharsis Region, In 40th Lunar and Planetary Science Conference, Abstract #1118.
- **T. F. Stepinski** and Erik R. Urbach (2009) The First Automatic Survey of Impact Craters on Mars: Global Maps of Depth/Diameter Ratio, In 40th Lunar and Planetary Science Conference, Abstract #1117.

- W. Luo and **T. F. Stepinski**, (2009) Global, Computer-generated Map of Valley Networks on Mars, In 40th Lunar and Planetary Science Conference, Abstract#1311.
- E.R. Urbach and **T.F. Stepinski** (2008) Automatic Detection of Sub-Kilometer craters in High Resolution Images of Mars. In Lunar and Planetary Science XXXVIX, Abstract # 2184
- **T.F Stepinski** and E.R. Urbach (2008) Raster Maps of Craters Depths in Southern Hemisphere of Mars: Potential Proxy for Spatial Distribution of Ground Ice. In Lunar and Planetary Science XXXVIX, Abstract # 1272
- **T. F. Stepinski**, W. Luo, and Y. Qi (2007) Precision Mapping of Valley Networks in Margaritifer Sinus, Mars. In Lunar and Planetary Science XXXVIII, Abstract # 1205
- Ghosh, S., **T. F. Stepinski**, and R. Vilalta (2007) Automatic Mapping of Martian Landforms Using Segmentation-based Classification . In Lunar and Planetary Science XXXVIII, Abstract # 1200
- **T. F. Stepinski**, M. P. Mendenhall, and B. D. Bue (2007) Robust Automated Identification of Martian Impact Craters. In Lunar and Planetary Science XXXVIII, Abstract # 1202
- H. Gregoire-Mazzocco, **T. F. Stepinski**, P.J. McGovern, S. Lanzoni, A.Frascati, and A. Rinaldo (2006) Martian Meanders: Wavelength-Width Scaling and Flow Duration. In Lunar and Planetary Science XXXVII, Abstract # 1185
- **T. F. Stepinski**, M. Carriere, and I. Molloy (2006) Properties of Martian Highlands Drainage from THEMIS Images and MOLA Topography. In Lunar and Planetary Science XXXVII, Abstract # 1118.
- I. Molloy and T.F. Stepinski (2006) Automated Mapping of Valley Networks on Mars. In Lunar and Planetary Science XXXVII, Abstract # 1743.
- B. D. Bue and **T.F. Stepinski** (2006) Machine Detection of Martian Craters from Digital Topography. In Lunar and Planetary Science XXXVII, Abstract # 1178.
- **T. F. Stepinski** and A. P. Stepinski (2005) Inferring EarlyMars Climate from Comparison of Drainage Basins' Morphologies on Mars and Earth. In Lunar and Planetary Science XXXVI, Abstract # 1392.
- B. D. Bue and **T. F. Stepinski** (2005) Automated Classification of Landforms in Terra Cimmeria, Mars. In Lunar and Planetary Science XXXVI, Abstract # 1195.
- R. Vilalta and **T. F. Stepinski** (2004) Thematic Maps of Martian Topography Generated by a Clustering Algorithm. In Lunar and Planetary Science XXXV, Abstract # 1169.
- **T. F. Stepinski** and S. Coradetti (2004) Systematic Differences in Topography of Martian and Terrestrial Drainage Basins. In Lunar and Planetary Science XXXV, Abstract # 1166.
- **T. F. Stepinski** and M. L. Collier (2004) Computational Analysis of Drainage Basins on Mars: Appraising the Drainage Density. In Lunar and Planetary Science XXXV, Abstract # 1168.
- **T. F. Stepinski**, R. Vilalta, M. Achari, P. J. McGovern (2003) Algorithmic Classification of Drainage Networks on Mars and its Relation to Martian Geological Units. In Lunar and Planetary Science XXXIV, Abstract # 1653.
- M. L. Collier, **T. F. Stepinski**, P. J. McGovern, S. M. Clifford (2003) Martian Geomorphology from Fractal Analysis of Drainage Networks. In Lunar and Planetary Science XXXIV, Abstract # 1642.
- **T. F. Stepinski** and W. J. O'Hara IV (2003) Vertical Analysis of Martian Drainage Basins. In Lunar and Planetary Science XXXIV, Abstract # 1659.
- **T. F. Stepinski** M. M. Marinova, O. J. McGovern, and S. M. Clifford (2002) The Fractal Characteristics of Martian Drainage Basins: Implications for the Timing, Intensity, and Duration of Rainfall, Lunar and Planetary Science XXXIII, Abstract # 1347.
- K. Kornet, **T. F. Stepinski** and M. Rozyczka (2001) Diversity of Planetary Systems from Evolution of Solids in Protoplanetary Disks, Lunar and Planetary Science XXXII, Abstract # 1612.
- **T. F. Stepinski** and D. C. Black (2000) Statistical Similarities Between Populations of "Extrasolar Planets" and Stellar Companions, Lunar and Planetary Science XXXI, Abstract # 1378.
- R. Malhotra, **T.F. Stepinski**, and D.C. Black (2000) Orbital Dynamics Constraints on the Upsilon Andromedae System. Lunar and Planetary Science XXXI, Abstract # 1425..
- **T. F. Stepinski** (1999) Layered Accretion in the Solar Nebula, Lunar and Planetary Science XXX, Abstarct # 1205.
- **T. F. Stepinski** (1998) Diagnosing Properties of Protoplanetary Disks from their Evolution, Lunar and Planetary Science XXIX.
- **T. F. Stepinski** (1997) Modeling the Evolutionary History of the Solar Nebula, Lunar and Planetary Science XXVIII, p1373.
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