

## Chris Mattmann, Ph.D.

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### CONTACT INFORMATION

#### **Software Architect IV**

#### **Senior Computer Scientist**

Instrument Software and Science Data Systems Section

Pasadena, CA 91109 USA

*Voice:* (818) 354-8810

*E-mail:* [chris.a.mattmann@nasa.gov](mailto:chris.a.mattmann@nasa.gov)

NASA Jet Propulsion Laboratory

Office: 171-266B

*Fax:* (818) 393-7011

#### **Adjunct Assistant Professor**

Computer Science Department

Los Angeles, CA USA 90089

*Voice:* (213) 821-4336

*E-mail:* [mattmann@usc.edu](mailto:mattmann@usc.edu)

*WWW:* <http://sunset.usc.edu/~mattmann/>

University of Southern California

Office: SAL 216

*Fax:* (213) 740-7285

### RESEARCH INTERESTS

Software Architecture, Software Engineering, Search Engines, Information Retrieval, Resource Discovery, Distributed Computing Platforms, Large-scale, distributed systems, Data modeling, design and development of distributed data intensive systems.

### EDUCATION

**University of Southern California**, Los Angeles, CA USA

Ph.D., Computer Science, August 2007

- Dissertation Topic: "Software Connectors for Highly Distributed and Voluminous Data-intensive Systems"
- Advisor: Nenad Medvidović

M.S., Computer Science (Multimedia and Creative Technologies), August 2003

B.S., Computer Science, December 2001

### PROFESSIONAL EXPERIENCE

**Instrument Software and Science Data Systems Section, NASA Jet Propulsion Laboratory**, Pasadena, CA 91109 USA

*Software Architect IV*

**September 2011 - present**

*Senior Computer Scientist*

**September 2008 - present**

*Cognizant Development Engineer*

**August 2007 - present**

*Member of Key Staff*

**September 2006 - present**

*Staff Software Engineer*

**September 2005 - September 2008**

*Associate Software Engineer*

**January 2001 - August 2005**

Developed reusable science data processing system for the Orbiting Carbon Observatory, NPP Sounder PEATE, SMAP, and DESDynI Earth Science missions. Wrote proposals to government agencies incl. NASA, NSF, DOD and the NIH. Vice President of open source project out of JPL called Object Oriented Data Technology, or OODT, runner-up NASA software of the year 2003, and the first NASA project to enter the Apache Software Foundation (ASF). Development Lead supervising development team, delivery, schedule and architecture on bio-informatics task. Principal Investigator on Software Royalty and Reinvestment Fund (SRRF) task to develop a climate model diagnostics package. Study PI for investigating architectural tradeoffs in the DESDynI mission. Task manager for 2009 ARRA funded effort to build a modeling parameter database for California Water Resource Management, awarded West Federal Labs Consortium Outstanding Partnership Award in 2011. Co-investigator and progenitor of winning ROSES ACCESS 2007 proposal to develop a Virtual Oceanographic Data Center. Co-investigator on winning NASA IPP Seed Fund 2008 proposal to link NASA climate models to the DOE Earth System Grid (ESG). Co-investigator on winning JPL R&TD task to construct a virtual grid system for Climate Data. Co-Investigator on

winning NIH Challenge Grant to construct a virtual pediatric health data system for decision making in patient critical care. Co-Investigator on ROSES ACCESS 2009 proposal to develop a data management system for coastal ocean data. Data System Lead and Co-I on two winning NASA National Climate Assessment proposals in Regional Climate Modeling and in Snow Hydrology for the Western US and Alaska. Co-Investigator on winning UK Climate and Development Knowledge Network (CDKN) collaboration proposal to develop regional climate modeling software with the University of Cape Town. Data System Lead for the JPL Airborne Snow Observatory (ASO) airborne demonstration mission.

**Viterbi School of Engineering, University of Southern California**, Los Angeles, CA 90089 USA

*Adjunct Assistant Professor*

**November 2008 - present**

*Part-time Faculty*

**November 2007 - November 2008**

Taught graduate level course in Software Architectures (CSCI 578) to a class of over 60 students, including remote professionals. Taught both a distance education (DEN) lecture, as well as on-campus version of the class. Developed syllabus for and taught course in Information Retrieval and Search Engines (CSCI 572) during Summer 2010 and 2011. Participated in writing proposals to the U.S. National Science Foundation, and other agencies. Participated in program committees and reviewed papers for various prestigious international conferences incl. the ACM WWW 2009 conference, ICSE, and ASE, and journals including the Journal of Systems and Software, and IEEE Transactions on Software Engineering and IEEE Transactions on Dependable and Secure Computing. Participated and led paper writing efforts to ICSE and other conferences. Mentored and collaborated with several software architecture Ph.D. students. Established a successful research and industry collaboration with NASA JPL and USC.

**Earth Science Data System (ESDS) Working Groups, National Aeronautics and Space Administration**, Washington, DC 20546-0001 USA

*Chair, Software Reuse Working Group*

**October 2009 - present**

Responsible for setting direction of software reuse for Earth science data systems research and making recommendations to NASA regarding identification, infusion, and dissemination of reusable assets. Organize telecons, meetings, and participate in reviews with NASA HQ program officers in Earth science research. Inform other working groups, including Software Metrics, Technology Infusion, and Software Process. Broadly advocate, and disseminate software developed on NASA Earth science data system missions, as well as in Distributed Active Archive Centers (DAACs) and downstream data analysis research projects (MeASURES and ACCESS).

**Apache Software Foundation**, Forest Hill, MD USA

*Member, Apache Software Foundation*

**March 2010 - present**

*VP, Apache OODT, OODT Project*

**November 2010 - present**

*VP, Apache Tika, Tika Project*

**April 2010 - present**

*Project Management Committee, Incubator Project*

**April 2010 - present**

*Project Management Committee, Nutch Project*

**April 2010 - present**

*Project Management Committee, Tika Project*

**April 2010 - present**

*Project Management Committee, Lucene Project*

**October 2009 - May 2010**

*Committer and Co-Founder, Tika project*

**March 2007 - present**

*Committer, Nutch project*

**October 2006 - present**

Voted to become the *first* NASA member of the Apache Software Foundation, helping to steer and set the direction for the overall ASF. Voted to be a Project Management Committee (PMC) member of the Apache Lucene project. Apache Lucene produces software for enterprise search and information retrieval, facet-based data-discovery, content detection, analysis and large-scale, distributed data mining algorithms. Provide project direction and leadership, vote on project releases, help guide community including 1000s of developers around the world. Developed original proposal and plan for Tika, a content analysis toolkit, in collaboration with existing Apache Nutch committer Jerome

Charron. Tika provides a framework for content analysis and metadata extraction. Led the ascension of Tika into Apache Top Level Project (TLP) status. Tika release manager for the 0.1-incubating, 0.3, 0.4, 0.5, 0.6, 0.7 and 0.8 releases. Contributed several patches to Nutch, most notable were an RSS Parsing plugin, a complete redesign of the ParserFactory, Metadata container support, and an automatically generated web context file, including web parameter support to the Nutch webapp. Most of this work was done in collaboration with existing committer Jerome Charron. Nutch release manager for 0.9, 1.1 and 1.2 releases. Contributed CombiningTokenFilter for Apache Lucene that allows sorting on string titles that includes stop word removal, stemming, and synonym analysis on sortable fields. Contributed several patches to Apache SOLR during this time, committed during the 1.5 release cycle, and also contributed to what eventually became Apache Hadoop. Championed Incubator projects including OODT, SIS, Lucy, and Gora.

**Web Development and Engineering, E50.com, Inc, Hollywood, CA USA**

*Senior Software Consultant*

**September 2000 - August 2003**

Led software development and backend engineering for a major Internet hosting and development company that serviced over 500 web sites. Utilized Microsoft technologies incl. ASP, MS SQL Server and engaged in requirements gathering and interaction with customers and end-users. Designed and implemented several web sites including <http://snookies.com>.

**Engineering Team, Iwin.com, Inc, Westwood, CA USA**

*Engineering Intern*

**February 2000 - August 2000**

One of about 4 interns tasked with developing Java-based games for target demographic of 35-55 year old adults. Participated in software design and development, constructed query result caching mechanism that optimized DB query time against MS SQL Server by 25%. Helped formulate ranking algorithm for games listed on the site.

**HONORS AND  
AWARDS**

SoftArtisans 30 Hadoop and Big Data Spelunkers Worth Following List  
<http://bit.ly/vEUQre>, 2011.

JPL Mariner Award, Outstanding Individual Contribution, Instrument Software and Science Data Systems, 2011.

West Federal Labs Consortium Outstanding Partnership Award, NASA ARRA Water Resource Management Project, 2011.

First NASA Member of the Apache Software Foundation (ASF), 2010.

NASA Team Award, Orbiting Carbon Observatory (OCO), 2009.

NASA Group Achievement Award, Planetary Data System (PDS), 2008.

NASA Software Reuse WG Peer-Recognition Award (OODT CAS), October 2008.

NASA Space Act Award (OODT CAS), September 2008.

NASA Team Bonus Award, Orbiting Carbon Observatory (OCO) mission, September 2008.

NASA Tech Briefs Award (OODT CAS), October 2007.

NASA Group Achievement Award, Planetary Data System (PDS), October 2007.

NASA Group Achievement Award, Object Oriented Data Technology (OODT) project, October 2007.

SIGSOFT CAPS Travel Scholarship, Doctoral Symposium, ASE, Tokyo, Japan, July 2006

Travel Scholarship, Doctoral Symposium, ICSE, Shanghai, China, May 2006

Teaching Assistantship Award, Department of Computer Science, USC, September 2003, February

2004, September 2004, January 2005, January 2007

Dean's List Recipient, School of Engineering ,USC, 1999

## ACADEMIC EXPERIENCE

**University of Southern California**, Los Angeles, California USA

*Adjunct Assistant Professor*

**November 2008 - present**

*Part-time Faculty*

**November 2007 - November 2008**

Taught graduate level course in Software Architectures (CSCI 578) to a class of over 60 students, including remote professionals. Taught both a distance education (DEN) lecture, as well as on-campus version of the class. Taught a graduate course in Search Engines and Information Retrieval (CSCI 572) during the Summer 2010 semester.

*Graduate Student*

**August 2002 - December 2007**

Includes Ph.D. research, Ph.D. and Masters level coursework and research projects. Active participant in proposal writing to funding agencies such as NASA, NSF, and the NIH.

*Teaching Assistant*

**September 2003 - May 2007**

TA for graduate level courses on Software Architectures, Software Engineering for Embedded Systems, and Operating Systems. Shared responsibility for lectures, exams, homework assignments, and grades.

- CSCI 578: Software Architectures, Spring 2005, Spring 2007
- CSCI 589: Software Engineering for Embedded Systems, Fall 2004
- CSCI 402: Operating Systems, Fall 2003, Spring 2004

*Senior Grader*

**September 2001 - August 2003**

Senior grader for graduate and undergraduate level courses on Issues of Programming Language Design and Programming the WWW. Shared responsibility for exams, homework assignments, and grades.

- CSCI 571: Issues of Programming Language and Design, Spring 2001, Summer 2003
- CSCI 351: Programming the WWW, Fall 2001, Spring 2002

## COURSE DEVELOPMENT

### Industry

#### 1. **PCS Technology Pilot Course**

NASA Jet Propulsion Laboratory Professional Development Program

January 2010

Instructors: C. Mattmann and D. Freeborn

Class Size: ~10 students

Basic training in JPL's Object Oriented Data Technology (OODT) Process Control System (PCS) Software and its applicability to science data processing systems. Topics covered include the PCS heritage, PCS architecture and 2 hands-on code development exercises in the afternoon involving RSS, Podcasting, iTunes, and file and workflow management.

## MEDIA

### Articles

1. NASA Spinoff Magazine. Frameworks Coordinate Scientific Data Management. *NASA Spinoff Magazine*, 2011.  
<http://t.co/6A17FK4N>
2. A. Howard. Open Source is Mission Critical for NASA. *O'Reilly Radar*,  
<http://radar.oreilly.com/print/2011/04/nasa-open-source.html>, 2011.
3. A. Howard. NASA Technology leads to better Medical Decisions. *O'Reilly Radar*,  
<http://radar.oreilly.com/2010/06/harnessing-open-source-grid-so.html>, 2010.

### Podcasts

1. C. Mattmann “Episode 078 TMTc Chris Mattmann OODT/NASA”. Teach Me To Code Podcast. Charles Max Wood, for TeachMeToCode.com. ApacheCon NA 2011 ancillary interview, Vancouver, BC, November 11, 2011, published December 30, 2011. <http://teachmetocode.com/podcast/078-tmtc-chris-mattman-oodtnasa/>
2. C. Mattmann. “Episode 69 - Apache Tika”. FeatherCast - An unofficial podcast from the world of the Apache Software Foundation. August 11th, 2010. Rich Bowen for FeatherCast. <http://bit.ly/bhul1u>.
3. C. Mattmann. “NASA technology leads to better medical decisions”. O’Reilly Radar. June 16, 2010. Alex Howard, for O’Reilly Media, Government 2.0 Health IT series, for the O’Reilly Open Source Convention (OSCON) 2010, Portland, Oregon, July 19-23. <http://oreil.ly/d2vRk4>.
4. C. Mattmann. “An Architecture-based Framework for Biomarker Discovery and Management in the Early Detection Research Network.” BlogTalk Radio. February 2, 2010. International Quality & Productivity Center (IQPC) New York (IQPC-NYC) in preparation for the 6th Laboratory Informatics Conference, Philadelphia, PA. February 2, 2010. <http://bit.ly/bQR6Mp>.

### Webinars

1. The Quest for Canada’s Smartest IT. “Conquering the Data Deluge”. Chris A. Mattmann, NASA, David Corrigan, IBM InfoSphere. February 14, 2012. <http://twebevent.com/bigdatachat>

## PUBLICATIONS

### Books

1. C. Mattmann and J. Zitting. *Tika in Action*. 256 pages. New York: Manning Publications, November 2011. ISBN: 9781935182856. <http://www.amazon.com/Tika-Action-Chris-Mattmann/dp/1935182854>

### Refereed Journals

1. B. R. Barkstrom, C. Mattmann. A Simple Model Illustrating the Virtue of Replication for Long-Term Information Preservation. Submitted to *Earth Science Informatics*, January 2012.
2. C. Mattmann, D. Crichton, A. Hart, S. Kelly, C. Goodale, R. R. Downs, P. Ramirez, J. S. Hughes, F. Lindsay. Understanding Open Source Software at NASA. *IEEE IT Professional – Special Theme on NASA Contributions to IT*, Vol. 14, No. 2, pp. 29-35, March/April 2012.
3. C. Mattman, B. Foster, A. Chang, D. Crichton, D. Freeborn, D. Woollard. Generic, Extensible, Configurable Push-Pull Framework for Large-Scale Science Missions. *NASA Tech Briefs*, Vol. 35, No. 7, pp. 50, July 2011.
4. C. Mattmann, N. Medvidovic, S. Malek, G. Edwards, S. Banerjee. A Middleware Platform for Providing Mobile and Embedded Computing Instruction to Software Engineering Students. *IEEE Transactions on Education*, To appear.
5. D. Crichton, C. Mattmann, L. Cinquini, A. Braverman, D. Waliser, A. Hart, C. Goodale, P. Lean. Software and Architecture for Sharing Satellite Observations with the Climate Modeling Community. *IEEE Software*, Accepted for publication, to appear, 2012.
6. C. Mattmann, R. R. Downs, J. J. Marshall, N. Most, S. Samadi. Tools to Support the Reuse of Software Assets for the NASA Earth Science Decadal Survey Missions. *IEEE Geoscience and Remote Sensing Newsletter*, March 2011, Issue 158, pp. 17-22.
7. C. Mattmann, D. Crichton, A. Hart, S. Kelly, J. S. Hughes. Experiments with Storage and Preservation of NASA’s Planetary Data via the Cloud. *IEEE IT Professional – Special Theme on Cloud Computing*, Vol. 12, No. 5, pp. 28-35, September/October, 2010.

8. C. Mattmann, A. Braverman, D. Crichton. Understanding Architectural Tradeoffs Necessary to Increase Climate Model Intercomparison Efficiency. *ACM SIGSOFT Software Engineering Notes*, vol. 35, no. 3, pp. 1-6, May 2010.
9. J. S. Hughes, D. Crichton and C. Mattmann. Ontology-Based Information Model Development for Science Information Reuse and Integration. *International Transactions on Systems Science and Applications - Special Issue on Information Reuse in Databases and Data Mining*, Vol 6., No. 2/3, pp. 200-211, August 2010.
10. N. Medvidovic and C. Mattmann. Leveraging Software Architecture to Reconcile the Promise and Reality of Grid Computing. *Infosys Technology Roundtable (TRT) newsletter*, September 2009.
11. C. Mattmann, D. Freeborn, D. Crichton, J. S. Hughes, P. Ramirez, S. Hardman, D. Woollard, and S. Kelly. Transformation of OODT CAS To Perform Larger Tasks. *NASA Tech Briefs*, Vol. 32, No. 6, pp. 44, June 2008.
12. D. Woollard, N. Medvidovic, Y. Gil, and C. Mattmann. Scientific Software as Workflows: From Discovery to Distribution. *IEEE Software – Special Issue on Developing Scientific Software*, Vol. 25, No. 4, July/August, 2008.
13. J. Steven Hughes, D. Crichton, S. Kelly, C. Mattmann, J. Crichton, and T. Tran. Intelligent Resource Discovery using Ontology-based Resource Profiles. *Data Science Journal*, Vol. 4, pp. 171-188, December 2005. Article available at: <http://journals.eecs.qub.ac.uk/codata/journal/contents/4.05/4.05pdfs/DS415.pdf>
14. S. Banerjee, C. Mattmann, N. Medvidovic, L. Golubchik. Leveraging architectural models to inject trust into software systems. *ACM SIGSOFT Software Engineering Notes*, vol. 30, no. 4, pp. 1-7, July 2005.

### Book Chapters

1. C. Mattmann, D. Crichton, A. Hart, C. Goodale, J. S. Hughes, S. Kelly, L. Cinquini, T. H. Painter, J. Lazio, D. Waliser, N. Medvidovic, J. Kim, P. Lean. Architecting Data-Intensive Systems. In *Handbook of Data Intensive Computing*, B. Furht, A. Escalante, eds. 1st Edition. Springer Verlag, 2011.
2. D. Crichton, C. Mattmann, J. S. Hughes, S. Kelly, and A. Hart. A Multi-Disciplinary, Model-Driven, Distributed Science Data System Architecture. In *Guide to e-Science: Next Generation Scientific Research and Discovery*. X. Yang, L. L. Wang, W. Jie, eds. 1st Edition. XVIII, 558 p. 184 illus., Springer Verlag, ISBN 978-0-85729-438-8, 2011.
3. D. Crichton, C. Mattmann, M. Thornquist, J. S. Hughes, K. Anton. Bioinformatics: Biomarkers of Early Detection. In *Translational Pathology of Early Cancer*. W. Grizzle, S. Srivastava, eds. IOS Press, Cancer Biomarkers Volume 9, Number 1-6 / 2011, pp. 511-530.
4. C. Mattmann and N. Medvidovic. The Grid Lite DREAM: Bringing the Grid to your Pocket. In *Reliable Systems on Unreliable Networked Platforms*. F. Kordon, J. Sztipanovits, eds. Springer Verlag, (LNCS) 4322, pp. 70-87, 2007.

### Refereed Conferences and Workshops

1. C. Mattmann. A Strategy for Open Source Software at NASA. To appear in *Proceedings of the UCAR SEA Software Engineering Conference 2012*, Boulder, CO, February 21-24, 2012.
2. C. Mattmann. The Apache OODT Ecosystem: A Bird's Eye View. To appear in *Proceedings of the UCAR SEA Software Engineering Conference 2012*, Boulder, CO, February 21-24, 2012.
3. R. Ferraro, A. Bingham, A. Braverman, H. Hua, C. Mattmann, M. Yew. How Far Should the DACs Evolve? Submitted to *IEEE Geoscience and Remote Sensing Symposium*, Munich, Germany, July 22-27, 2012.

4. D. L. Jones, K. Wagstaff, D. Thompson, L. D'Addario, R. Navarro, C. Mattmann, W. Majid, J. Lazio, R. Preston, and U. Rebbapragada. Big Data Challenges for Large Radio Arrays. Submitted to the *IEEE Aerospace Conference*, Big Sky, Montana, March 3-10, 2012.
5. S. Marru, L. Gunathilake, C. Herath, P. Tangchaisin, M. Pierce, C. Mattmann, R. Singh, T. Gunarathne, E. Chinthaka, R. Gardler, A. Slominski, A. Douma, S. Perera, S. Weerawarana. Apache Airavata: A framework for Distributed Applications and Computational Workflows. In *Proceedings of the SC 2011 Workshop on Gateway Computing Environments*, Seattle, WA, November 18, 2011.
6. C. Mattmann, D. Crichton, J. S. Hughes, P. Ramirez, S. Hardman, A. Hart, C. Goodale. Rapid and Effective Construction of Science Data Archives and Repositories using the OODT Process Control System. Abstract IN51D-01 presented at *2011 Fall Meeting, AGU*, San Francisco, Calif., 5-9 Dec.
7. R. Verma, C. Goodale, A. Hart, E. Law, D. Crichton, C. Mattmann, M. Gunson, A. Braverman, H. Nguyen, A. Aldering, B. Castano, G. Osterman. A Virtual Science Data Environment for Carbon Dioxide Observations. Abstract IN33D-1486 presented at *2011 Fall Meeting, AGU*, San Francisco, Calif., 5-9 Dec.
8. P. Ramirez, C. Goodale, B. Bui, G. Chang, R. Kim, E. Law, S. Malhotra, L. Rodriguez, S. Sadaqathullah, C. Mattmann, D. Crichton. Application of Open Source Software by the Lunar Mapping and Modeling Project. Abstract IN21D-08 presented at *2011 Fall Meeting, AGU*, San Francisco, Calif., 5-9 Dec.
9. D. Jones, C. Mattmann, A. Hart, J. Lazio, T. Bennett, K. Wagstaff, D. Thompson, R. Preston. Scalable Data Mining and Archiving for the Square Kilometre Array. Abstract IN23B-1456 presented at *2011 Fall Meeting, AGU*, San Francisco, Calif., 5-9 Dec.
10. C. Mattmann, D. Crichton, F. Lindsay, S. Berrick, J. J. Marshall, R. Downs. Defining an Open Source Strategy for NASA. Abstract IN21D-02 presented at *2011 Fall Meeting, AGU*, San Francisco, Calif., 5-9 Dec.
11. A. Hart, C. Goodale, C. Mattmann, P. Lean, J. Kim, P. Zimdars, D. Waliser, D. Crichton. A Reusable Framework for Regional Climate Model Evaluation. Abstract IN21D-07 presented at *2011 Fall Meeting, AGU*, San Francisco, Calif., 5-9 Dec.
12. J. S. Hughes, D. Crichton, C. Mattmann, R. Joyner, E. Rye, S. Hardman, P. Ramirez, S. Kelly, E. Law. The Role of Shared Information Models for Software Reuse in Cross-Disciplinary Data Systems. Abstract IN21D-06 presented at *2011 Fall Meeting, AGU*, San Francisco, Calif., 5-9 Dec.
13. J. Kim, D. Waliser, P. Lean, C. Mattmann, C. Goodale, A. Hart, P. Zimdars, B. Hewitson, C. Jones. Evaluation of the multi-model CORDEX-Africa hindcast using RCMES. Abstract A23C-0188 presented at *2011 Fall Meeting, AGU*, San Francisco, Calif., 5-9 Dec.
14. D. Waliser, J. Kim, C. Mattmann, C. Goodale, A. Hart, P. Zimdars, P. Lean. A Regional Climate Model Evaluation System based on contemporary Satellite and other Observations for Assessing Regional Climate Model Fidelity. Abstract GC21E-01 presented at *2011 Fall Meeting, AGU*, San Francisco, Calif., 5-9 Dec.
15. D. Crichton, C. Mattmann, A. Hart, J. S. Hughes, S. Hardman, E. Law, S. Kelly. Leveraging Open Source Technologies to Build Scientific Data Systems. Abstract IN21D-01 presented at *2011 Fall Meeting, AGU*, San Francisco, Calif., 5-9 Dec.
16. C. Goodale, T. H. Painter, C. Mattmann, A. F. Hart, P. Ramirez, P. Zimdars, A. C. Bryant. Building a Snow Data System on the Apache OODT Open Technology Stack. Abstract IN31A-1434 presented at *2011 Fall Meeting, AGU*, San Francisco, Calif., 5-9 Dec.
17. J. S. Hughes, D. Crichton, S. Hardman, R. Joyner, C. Mattmann, P. Ramirez and S. Kelly. An Ontology Driven Information Architecture for Interoperable Disparate Data Sources. In *Proceedings of EGU General Assembly 2011 (EGU)*, Vol. 13, EGU2011-9509, 2011.

18. C. Mattmann, A. Hart, D. Jones, R. Preston. SKA Data Archiving using Apache OODT. *Proceedings of SKA 2011: The international Square Kilometre Array Forum: Science and Frontiers of Astronomy in the Era of Massive Datasets: The Promise and Challenges*, Banff, Canada, 4-8 July 2011.
19. D. Jones, K. Wagstaff, D. Thompson, L. D'Addario, R. Navarro, C. Mattmann, W. Majid, J. Lazio, and R. Preston. Fast Transient Detection as a Prototypal Big Data Problem. Submitted to the *International Astronomical Union Symposium 285: New Horizons in Time Domain Astronomy*, Oxford, UK, September 19-23, 2011.
20. J. Marshall, R. R. Downs, C. Mattmann. Software Reuse Methods to Improve Technological Infrastructure for e-Science. In *Proceedings of IEEE IRI - Workshop on Issues and Challenges in Social Computing (WICSOC 2011)*, pp. 528-532, Las Vegas, NV, August 2, 2011.
21. J. Garcia, D. Popescu, C. Mattmann, N. Medvidovic, and Y. Cai. Enhancing Architectural Recovery Using Concerns. To appear in *Proceedings of the 26th IEEE/ACM International Conference On Automated Software Engineering*, Lawrence, Kansas, November 6-10, 2011.
22. D. Waliser, P. Lean, J. Kim, C. Goodale, A. Hart, C. Mattmann, P. Zimdars. A Regional Climate Model Evaluation System based on Satellite and other Observations for Application to CMIP-IPCC/AR Downscaling. In *Proceedings of the World Climate Research Program (WCRP) Meeting*, Denver, CO, October 24-28, 2011.
23. J. Kim, D. Waliser, P. Lean, C. Mattmann, C. Goodale, A. Hart, P. Zimdars, B. Hewitson, C. Lennard, A. Favre, Colin Jones, G. Nikulin. Evaluation of the multiple-model CORDEX-Africa hindcast experiment using the RCMES. In *Proceedings of the World Climate Research Program (WCRP) Meeting*, Denver, CO, October 24-28, 2011.
24. L. Cinquini, A. Braverman, D. Crichton, C. Mattman, D. Waliser, D. Williams. Building the Software Infrastructure to Enable Usage of Satellite Observations for Climate Change. In *Proceedings of the World Climate Research Program (WCRP) Meeting*, Denver, CO, October 24-28, 2011.
25. D. Crichton, C. Mattmann, A. Hart, D. Kale, R. Khemani, P. Ross, S. Rubin, P. Veeravatanayothin, R. C. Wetzel, A. Braverman, C. Goodale. An Informatics Architecture for the Virtual Pediatric Intensive Care Unit. In *Proceedings of the 24th IEEE International Symposium on Computer-Based Medical Systems (CBMS 2011)*, Bristol, UK, June 27-30, 2011.
26. J. S. Hughes, D. Crichton, S. Hardman, R. Joyner, P. Ramirez and C. Mattmann. Practical Uses for a Domain Ontology. In *Proceedings of the International Conference on Ensuring Long-Term Preservation and Adding Value to Scientific and Technical Data (PV2011)*. November 15-17, 2011, Toulouse, France.
27. S. Pascoe, C. Mattmann, A. Stephens, P. Kershaw. Maximising the utility of OPeNDAP datasets through the NetCDF4 API. In *Proceedings of the Global Organization for Earth System Science Portals (GO-ESSP) Workshop*, Ashville, NC, May 10-11, 2011.
28. A. Hart, S. Kelly, D. Crichton, M. Thornquist, H. Kincaid, C. Mattmann, S. Reid, G. Warnick, P. Lin, C. Patriotis, S. Srivastava. Integrating Biospecimen Data into the EDRN Public Portal. In *Proceedings of the 2011 Annual Biospecimen Research Network (BRN) Symposium*, Bethesda, MD, March 28-29, 2011.
29. D. Jones, R. Preston, R. Navarro, K. Wagstaff, C. Mattmann, L. D'Addario, D. Thompson, W. Majid, J. Lazio. Technology Development for Large Radio Arrays at the Jet Propulsion Laboratory. *American Astronomical Society (AAS) meeting*, Boston, MA, May 22-26, 2011.
30. J. Tran, L. Cinquini, C. Mattmann, P. Zimdars, D. Cuddy, K. Leung, O. Kwoun, D. Crichton and D. Freeborn. Evaluating Cloud Computing in the NASA DESDynI Ground Data System. In *Proceedings of the ICSE 2011 Workshop on Software Engineering for Cloud Computing - SECLOUD*, Honolulu, HI, May 22, 2011.

31. A. Hart, C. Goodale, C. Mattmann, P. Zimdars, D. Crichton, P. Lean, J. Kim, and D. Waliser. A Cloud-Enabled Regional Climate Model Evaluation System. In *Proceedings of the ICSE 2011 Workshop on Software Engineering for Cloud Computing - SE-CLOUD*, Honolulu, HI, May 22, 2011.
32. C. Mattmann and N. Medvidovic. Domain-Specific Software Architectures for Cloud Computing. In *Proceedings of the Ground System Architectures Workshop*, Los Angeles, CA, February 28-March 3, 2011.
33. P. Lean, J. Kim, D. E. Waliser, A. Hall, C. Mattmann, S. L. Granger, K. Case, C. Goodale, A. Hart, B. Guan, N. Molotch, and S. Kaki. A Regional Climate Model Evaluation System based on Satellite and other Observations for Application to CMIP/AR Downscaling. *91st American Meteorological Society Annual Meeting*, Seattle, WA, Jan. 23-27, 2011.
34. D. Crichton, J. S. Hughes; C. Mattmann, E. Law and S. Hardman. Developing Software Product Lines for Science Data Systems. Abstract IN53B-1172 presented at *2010 Fall Meeting, AGU*, San Francisco, Calif., 13-17 Dec 2010.
35. D. Crichton, C. Mattmann, A. Braverman and L. Cinquini. A Distributed, Cross-Agency Software Architecture for Sharing Climate Models and Observational Data Sets. Abstract IN42A-02 presented at *2010 Fall Meeting, AGU*, San Francisco, Calif., 13-17 Dec 2010.
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2. C. Mattmann. Review of: Run-time models for self-managing systems and applications. *ACM Computing Reviews*. Review #: CR123344, November 2011.
3. C. Mattmann. Review of: Rigi-An environment for software reverse engineering, exploration, visualization, and redocumentation. *ACM Computing Reviews*, Review #: CR138524, October 2010.
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#### INTERNATIONAL STANDARDS

“Information Architecture for Space Data Systems” Consultative Committee on Space Data Systems (CCSDS) Information Architecture Working Group (IA-WG) Currently *Draft Green Book Status*  
<http://www.ccsds.org/docu/dscgi/ds.py/Get/File-1609/CCSDSInfoArch-new.pdf>

#### RESEARCH GRANTS **Awarded**

1. National Aeronautics and Space Administration: ROSES AIST  
 “Advanced Rapid Imaging & Analysis for Monitoring Hazards (ARIA-MH)”  
 Duration: 4/2012-03/2016  
 Role: Co-Investigator  
 Amount: 1.5M  
 PI(s): Hook Hua, JPL  
 Co-I(s):  
 Dr. Chris A. Mattmann, JPL  
 Dr. Susan Owen, JPL  
 Dr. Sang-Ho Yun, JPL  
 Dr. Angelyn Moore, JPL  
 Dr. Paul Lundgren, JPL  
 Dr. Chris Mattmann, JPL  
 Ms. Jennifer Cruz, JPL  
 Dr. Mark Simons, Caltech
  
2. National Aeronautics and Space Administration: ROSES ACCESS  
 “Collaborative Climate Model and Observational Data Services”  
 Duration: FY2012-FY2013  
 Role: Co-Investigator  
 Amount: 789.4K  
 PI(s): Hook Hua, JPL  
 Co-I(s):  
 Eric Fetzer, JPL  
 Brian Kahn, JPL  
 Chris Mattmann, JPL  
 Brian Wilson, JPL  
 Sun Wong, JPL  
 Michael Bosilovich, GSFC

3. Climate and Development Knowledge Network (CDKN) collaboration between knowledge brokers: (Co-Investigator)  
“Linking stakeholders with integrated climate change data”  
Duration: FY2012  
Amount: 130.7K  
PI: Bruce Hewitson, University of Cape Town  
CO-I(s): Chris A. Mattmann, Jet Propulsion Laboratory & USC  
Roger Street, Oxford University
4. National Climate Assessment - NASA Centers Call for Proposals: (Co-Investigator)  
“Snow and Ice Climatology of the Western United States from MODIS”  
Duration: FY11-FY13  
Amount: 427.5K  
PI: Thomas Painter, Jet Propulsion Laboratory  
CO-I(s): Chris A. Mattmann, Jet Propulsion Laboratory & USC
5. National Climate Assessment - NASA Centers Call for Proposals: (Co-Investigator)  
“Enabling Regional Climate Model Evaluation: A Critical Use of Observations for Establishing Core NCA Capabilities”  
Amount: 866.7K  
PI: Duane Waliser, Jet Propulsion Laboratory  
CO-I(s): Chris A. Mattmann, Jet Propulsion Laboratory & USC  
Jinwon Kim, UCLA  
Linda Mearns, NCAR
6. National Aeronautics and Space Administration - Earth Science Data Information System Project: (Principal Investigator)  
“Support for the NASA Earth Science Data Systems Software Reuse Working Group”  
Duration: FY2011-FY2012  
Amount: 542K  
PI(s): Chris Mattmann
7. Jet Propulsion Laboratory - Research and Technology (R&TD) Development Fund: (Principal Investigator)  
“Square Kilometer Array Initiative: Scalable Data Archiving and Mining”  
Duration: FY2011-FY2013  
Amount: 170K  
PI(s): Chris Mattmann, Jet Propulsion Laboratory
8. Jet Propulsion Laboratory - Strategic Investments for Earth Science : (Principal Investigator)  
“Regional Climate Modeling Evaluation System”  
Duration: FY2011  
Amount: 120K  
PI(s): Chris Mattmann, Jet Propulsion Laboratory  
Co-I(s): Andrew Hart, Jet Propulsion Laboratory  
Dayton Jones, Jet Propulsion Laboratory
9. National Aeronautics and Space Administration - American Recovery and Reinvestment Act : (Principal Investigator)  
“IT Modeling Database: Water Resource Management”  
Duration: FY2010  
Amount: 65K  
PI(s): Chris Mattmann, Jet Propulsion Laboratory
10. Jet Propulsion Laboratory - Software Royalty Reinvestment Fund (SRRF)  
“Packaging and Disseminating the Climate Data eXchange (CDX) Software for Climate Model Diagnostics (CDX)”

- Duration: FY2010-11  
Amount: 53K  
PI(s): Chris Mattmann, Jet Propulsion Laboratory  
Co-I(s): Daniel J. Crichton, Jet Propulsion Laboratory  
Amy Braverman, Jet Propulsion Laboratory
11. National Aeronautics and Space Administration: ROSES ACCESS  
“Improving Discovery for Coastal Marine Web Services and Resources”  
Duration: FY2010-FY2012  
Role: Co-Investigator  
Amount: 583K  
PI(s): Ed Armstrong, JPL  
Co-I(s):  
Frank OBrien, SSA  
Dr. Dale Kiefer, USC, SSA  
Chris A. Mattmann, JPL
  12. National Institutes of Health - Recovery Act Limited Competition: NIH Challenge Grants in Health and Science Research (RC1)  
“Advanced Computational Framework for Decision Support in Critically Ill Children”  
Duration: FY2010-FY2012  
Amount: 1000K  
PI(s): Randall Wetzel, CHLA  
Co-I(s):  
Daniel J. Crichton, JPL  
Chris A. Mattmann, JPL  
Amy Braverman, JPL
  13. Jet Propulsion Laboratory - Research and Technology (R&TD) Development Fund: (Co-Investigator)  
“The Climate Data Exchange: A Distributed Science Analysis Environment for Climate Research”  
Duration: FY2009-FY2011  
Amount: 1300K  
PI(s): Amy Braverman, Jet Propulsion Laboratory  
Co-I(s): Daniel J. Crichton, Jet Propulsion Laboratory  
Chris Mattmann, Jet Propulsion Laboratory  
Robert Raskin, Jet Propulsion Laboratory  
David Woollard, Jet Propulsion Laboratory
  14. National Aeronautics and Space Administration: IPP Seed Fund  
“Facilitating Climate Modeling Research By Integrating NASA and the Earth System Grid”  
Duration: FY2009-FY2010  
Role: Collaborator  
Amount: 250K  
PI(s): Dan Crichton, JPL  
Dean Williams, LLNL  
Collaborator(s):  
Yi Chao, JPL  
Robert Raskin, JPL  
Amy Braverman, JPL  
Chris A. Mattmann, JPL
  15. National Aeronautics and Space Administration: ROSES ACCESS  
“Virtual Oceanographic Data Center”  
Duration: FY2008-FY2009  
Role: Co-Investigator

Amount: 597K  
PI(s): Robert Raskin, JPL  
Co-I(s):  
Chris A. Mattmann, JPL  
Jorge Vasquez, JPL  
Edward Armstrong, JPL

16. National Institutes of Health: Task Plan Renewal  
“EDRN Cancer Research Informatics Platform”  
Duration: FY2005-2008  
Role: Key Staff  
Amount: 4000K  
PI(s): Dan Crichton, Jet Propulsion Laboratory  
Status: Funded
17. Jet Propulsion Laboratory - Research and Technology (R&TD) Development Fund: (Co-  
Investigator)  
“Library of Reusable CMSV Tools”  
Duration: FY2004-FY2006  
Amount: 400K  
PI(s): Mark Kordon, Jet Propulsion Laboratory  
Co-I(s): Daniel J. Crichton, Jet Propulsion Laboratory  
Chris Mattmann, Jet Propulsion Laboratory  
Tom Boyce, Jet Propulsion Laboratory  
Jayne Dutra, Jet Propulsion Laboratory  
Norm Lamarra, Jet Propulsion Laboratory  
Young Lee, Jet Propulsion Laboratory  
Julia Dunphy, Jet Propulsion Laboratory  
Ted Specht, Jet Propulsion Laboratory  
Dana Freeborn, Jet Propulsion Laboratory

### **Pending**

1. NASA A.34 Earth Science Applications: Water Resources: (Co-Investigator)  
“Integration of precision NASA snow products with the operations of the Colorado Basin River  
Forecast Center to improve decision making under drought conditions”  
Duration: FY2012  
Amount: 120K  
PI: Thomas Painter, Jet Propulsion Laboratory  
CO-I(s): Chris A. Mattmann, Jet Propulsion Laboratory & USC  
Kevin Werner, NOAA  
Andy Wood, NOAA
2. NASA A.36 SERVIR Applied Sciences Team (Principal Investigator)  
“Multi-model Regional Climate Projection based on CORDEX Africa for Supporting the  
SERVIR East Africa Climate Change Impact Assessment Activities”  
Duration: Apr 2012-Mar 2016  
Amount: 776.9K  
PI: Chris A. Mattmann, Jet Propulsion Laboratory & USC  
CO-I(s): Duane Waliser, Jet Propulsion Laboratory  
Dan Crichton, Jet Propulsion Laboratory  
Jinwon Kim, UCLA JIFRESSE  
Collaborator(s): Bruce Hewitson, UCT  
Chris Jack, UCT  
Colin Jones, Rossby Centre
3. National Science Foundation: CBET - Sustainability Research Networks  
“A Regional Network along Coastal West Africa and Cape Verde for Weather Hazards, Climate

Change and Air Quality (WHCCAQ)”  
Duration: Sept 2012 - August 2017  
Role: Co Principal Investigator  
Amount: TBD  
PI(s): Gregory Jenkins, Howard University  
Co PI(s):  
Sen Chiao, San Jose State University  
Jinwon Kim, UCLA JIFRESSE  
John Trimble, Howard University  
Chris Mattmann, USC & JPL

4. National Science Foundation: Software Institutes - Software Infrastructure for Sustained Innovation (S2I2)  
“Conceptualizing an Institute for Sustainable Earth and Environmental Software (ISEES)”  
Amount: 582.7K  
PI(s): Matthew B. Jones, UCSB  
Co-PI(s): Peter Fox, RPI  
Carol B. Meyer, ESIP  
William K Michener, Long Term Ecological Research Network  
Mark P Schildhauer, UCSB  
Chris Mattmann, USC & NASA JPL
5. National Science Foundation: Major Research Instrumentation (MRI)  
“MRI: Development of RAPID - Radio Array of Portable Interferometric Detectors”  
Amount: 2.3M  
Duration: October 2012 - September 2015  
PI(s): Colin Lonsdale, MIT Haystack Observatory  
Co-PI(s): Chris A. Mattmann, NASA JPL  
Frank Lind, MIT Haystack Observatory
6. National Science Foundation: Smart Health and Wellbeing (SHB)  
“SHB: Type II (INT): An Open Source Informatics Platform for the Virtual Pediatric Intensive Care Unit”  
Amount: 1.9M  
Duration: Sept 2012 - August 2016  
PI(s): Chris A. Mattmann, USC  
Co-PI(s):  
Daniel J. Crichton, NASA JPL  
Randall Wetzel, Children’s Hospital Los Angeles & USC  
Senior Personnel:  
Andrew F. Hart, NASA JPL  
Cameron Goodale, NASA JPL  
David C. Kale, Children’s Hospital Los Angeles  
Paul Vee, Children’s Hospital Los Angeles  
Ricky Nguyen, Children’s Hospital Los Angeles  
Sheryl John, Children’s Hospital Los Angeles
7. NASA A.40 Computational Modeling Algorithms and Cyberinfrastructure (Principal Investigator)  
“Next Generation Cyberinfrastructure to Support Comparison of Satellite Observations with Climate Models”  
Duration: Sept 2012-August 2014  
Amount: 648.2K  
PI: Chris A. Mattmann, Jet Propulsion Laboratory  
CO-I(s):  
Luca Cinquini, Jet Propulsion Laboratory  
Pamela Rinsland, NASA Langley Research Center

Dean Williams, LLNL  
Chris Lynnes, NASA Goddard Space Flight Center  
Collaborator(s):  
Dan Crichton, Jet Propulsion Laboratory  
Amy Braverman, Jet Propulsion Laboratory  
Thomas Huang, Jet Propulsion Laboratory  
Duane Waliser, Jet Propulsion Laboratory

FORMAL  
PRESENTATIONS

1. *The Apache OODT Ecosystem: A Birds Eye View*. C. Mattmann. UCAR Software Engineering Assembly (SEA) Software Engineering Conference 2012, February 23, 2012.
2. *Understanding how to Best Leverage Open Source Data Management Software: A Roadmap*. C. Mattmann. Boulder Earth and Space Science Informatics Group (BESSIG), February 22, 2012. <http://bit.ly/zWC3zx>
3. *A Strategy for Open Source Software at NASA*. C. Mattmann. UCAR Software Engineering Assembly (SEA) Software Engineering Conference 2012, February 22, 2012.
4. *Realizing the Benefit of (Re-)using Open Source Software*. C. Mattmann. 2012 Winter ESIP Federation Meeting, Washington D.C., January 4, 2012.
5. *Defining an Open Source Strategy for NASA*. C. Mattmann. 2011 Fall Meeting, AGU, San Francisco, California, December 6, 2011.
6. *Apache Tika: 1 point Oh!*. C. Mattmann. ApacheCon NA 2011, Vancouver, BC, November 10, 2011. Available at: <http://na11.apachecon.com/talks/19391>.
7. *Supercharging your Apache OODT deployments with the Process Control System*. C. Mattmann. ApacheCon NA 2011, Vancouver, BC, November 9, 2011. Available at: <http://na11.apachecon.com/talks/19376>.
8. *A look into the Apache OODT ecosystem*. C. Mattmann. ApacheCon NA 2011, Vancouver, BC, November 9, 2011. Available at: <http://na11.apachecon.com/talks/19389>.
9. *An Introduction to the Apache OODT Ecosystem*. C. Mattmann. 10th NASA Earth Science Data Systems Working Group Meetings, Newport News, Virginia, November 2, 2011.
10. *NASA's Earth Science Data System Software Reuse WG: Year in Review 2011*. C. Mattmann, R. R. Downs, P. Ramirez, C. Goodale, A. Hart. 10th NASA Earth Science Data Systems Working Group Meetings, Poster Session, Newport News, Virginia, November 2, 2011.
11. *Discovering and Utilizing Coastal Ocean Data via NASA's CMDS*. E. Armstrong, C. Mattmann, F. O'Brien, L. Cinquini, G. Resneck, P. Zimdars. 10th NASA Earth Science Data Systems Working Group Meetings, Poster Session, Newport News, Virginia, November 2, 2011.
12. *Architecture Panel*. Moderator: J. Hammerbacher. C. Mattmann, D. Crichton, Z. Ives. Meaningful Use of Complex Medical Data (MUCMD) Symposium, Saban Research Institute, Children's Hospital Los Angeles (CHLA), Los Angeles, CA, August 26, 2011.
13. *Understanding the Meaningful Use of Open Source Software*. C. Mattmann. Meaningful Use of Complex Medical Data (MUCMD) Symposium, Saban Research Institute, Children's Hospital Los Angeles (CHLA), Los Angeles, CA, August 26, 2011.
14. *Software Reuse Methods to Improve Technological Infrastructure for e-Science*. C. Mattmann, J. Marshall, R. Downs. IEEE IRI Workshop on Issues and Challenges in Social Computing 2011, Las Vegas, NV, August 2nd, 2011.
15. *Open Source Software in the Sciences*. C. Mattmann. 2011 Summer ESIP Federation Meeting, Santa Fe, NM, July 14, 2011.
16. *Evaluating Cloud Computing in the NASA DESDynI Ground Data System*. C. Mattmann. 2011 Summer ESIP Federation Meeting, Santa Fe, NM, July 14, 2011.

17. *A report on THREDDS catalogs/OPeNDAP implementations for earth science data access and discovery.* Ed Armstrong, C. Mattmann. 2011 Summer ESIP Federation Meeting, Santa Fe, NM, July 12, 2011.
18. *Measuring the Suitability of Software for Reuse Using NASAs Software Reuse Readiness Levels.* C. Mattmann. SQI Technical Seminar, JPL, Pasadena, CA, June 15, 2011.
19. *Data Management Panel.* Speakers: R. Hanisch, C. Mattmann. Innovations in Data-Intensive Astronomy (2011) Meeting, Green Bank, WV, May 2-May 5, 2011.
20. *Understanding and Comparing Remote Sensing Data to Model Output.* International Conference on the Coordinated Regional Climate Downscaling Experiment - CORDEX Training Workshop, Trieste, Italy, March 21-March 26, 2011.
21. *A View from the Trenches: Open-source, Data-intensive Software.* C. Mattmann. Presented at the USC CSSE Annual Research Review (ARR), Los Angeles, CA March 9, 2011.
22. *NASA, JPL, CHLA and Data Systems Architecture.* C. Mattmann. Presented at the BedmasterEx Meeting, San Diego, CA January 15, 2011.
23. *Packaging Software Assets for Reuse.* C. Mattmann, J. Marshall, R. Downs. Presented at the 2010 AGU Fall Meeting, San Francisco, CA, December 17, 2010.
24. *Lessons Learned in the Development of a Web-scale Search Engine: Nutch2 and beyond.* C. Mattmann. ApacheCon NA 2010 - Lucene and friends Track, Atlanta, GA, November 5, 2010.
25. *Scientific data curation and processing with Apache Tika.* C. Mattmann. ApacheCon NA 2010 - Lucene and friends Track, Atlanta, GA, November 5, 2010.
26. *Reuse WG: Year in Review,* C. Mattmann, R. R. Downs, J. Marshall. 9th NASA Earth Science Data Systems Working Group Meetings, Poster Session, New Orleans, Louisiana, October 21, 2010.
27. *The NASA Coastal Marine Discovery Service (CMDS).* E. Armstrong, C. Mattmann, D. Kiefer, F. O'Brien, S. McCleese, V. Hwang. 9th NASA Earth Science Data Systems Working Group Meetings, Poster Session, New Orleans, Louisiana, October 21, 2010.
28. *Medical/Bioinformatics Informatics Panel.* Speakers: J. Cohn, R. Guha, T. Malik, D. Kale, C. Mattmann, E. Kolker, M. Atkinson. 4th Extremely Large Databases Workshop (XLDB4), Menlo Park, CA, October 5th, 2010.
29. *NASA JPL and Data Systems Architecture.* C. Mattmann. Presented to Search/Interaction Team at AT&T Interactive. Glendale, CA September 27, 2010.
30. *Reuse of Software Assets for the NASA Earth Science Decadal Survey Missions.* C. Mattmann, R. Downs, J. Marshall, N. Most, S. Samadi. Presented at the 30th IEEE International Geoscience and Remote Sensing Symposium (IGARSS 2010) Poster Session, Honolulu, HI, July 28th, 2010.
31. *Exploiting Reference Architecture to Guide the NASA Earth Science System Enterprise.* C. Mattmann. Presented at the 2010 ESIP Summer Federation Meeting, NASA Earth Science Data Systems (ESDS) Software Process and Standards WG breakout session on NASA Earth Science Reference Architectures. Knoxville, TN, July 22, 2010.
32. *Reuse Tools to Help Enable Climate Research in NASA Missions.* C. Mattmann, R. R. Downs, J. J. Marshall, N. F. Most. Presented at the 2010 ESIP Summer Federation Meeting Poster Session. Knoxville, TN, July 21, 2010.
33. *The Climate Data eXchange (CDX).* C. Mattmann. Presented at the 2010 ESIP Summer Federation Meeting, Technical Workshops. Knoxville, TN, July 20, 2010.
34. *Object Oriented Data Technology (OODT).* C. Mattmann. Presented at the 2010 ESIP Summer Federation Meeting, Technical Workshops. Knoxville, TN, July 20, 2010.

35. *Informatics and the caTissue Wrapper for the Early Detection Research Network*. C. Mattmann. Presented at the caBIG Tissue Banks and Pathology Tools and Integrated Cancer Research Workspaces Joint Face-to-Face Meeting. UCLA, Los Angeles, CA, May 4, 2010.
36. *Reuse Readiness Levels 1.0 Discussion*. C. Mattmann. Presented at the NASA Earth Science Data Systems (ESDS) Software Reuse Working Group (WG) Workshop on Reuse Readiness Levels. Washington D.C., April 7, 2010.
37. *An Architecture-based Framework for Biomarker Discovery and Management in the Early Detection Research Network*. C. Mattmann. Presented at the 6th Laboratory Informatics Conference, Philadelphia, PA, March 31, 2010.
38. *Open Source and the Cloud: IT Opportunities and Challenges Panel*. Speakers. J. Urquhart, C. Mattmann, E. Brescia. Open Source Business Conference (OSBC 2010). San Francisco, CA, March 17, 2010.
39. *An Architecture and Analysis Environment for Model to Observational Data Intercomparisons*. C. Mattmann, A. Braverman, D. Crichton and, D. Williams. Presented at the AGU Fall Meeting, San Francisco, CA, December 14, 2009.
40. *Enabling Interoperability – Supporting a Diversity of Search Paradigms Using Shared Ontologies and Federated Registries*. J. S. Hughes, D. Crichton, S. Hardman, C. Mattmann, and P. Ramirez. Presented at the AGU Fall Meeting, San Francisco, CA, December 14, 2009.
41. *A Distributed Computing Infrastructure for the Evaluation of Climate Models using NASA Observational Data*. C. Mattmann, D. Crichton, A. Braverman, D. Williams, M. Gunson, D. Woollard, S. Kelly and M. Cayan. Presented at the IEEE ICDM Workshop on Knowledge Discovery from Climate Data. Miami, FL, December 6th, 2009.
42. *Science Data System Architectural Approach for JPL-led Decadal Survey Missions*. C. Mattmann. Presented at the 8th Earth Science Data Systems Working Group (ESDSWG) Conference. Wilmington, DE, October 20th-22nd, 2009.
43. *An Adaptable Framework for Modeling, Processing, Distribution and Analysis of Science Data*. D. Freeborn, D. Woollard, C. Mattmann, S. Hardman, D. Crichton, P. Ramirez. Presented at the 8th Earth Science Data Systems Working Group (ESDSWG) Conference Poster Session. Wilmington, DE, October 20th-22nd, 2009.
44. *Integrating Modeling Capabilities in a Production Environment to Further Forecasting and Decision Support*. D. Woollard, D. Freeborn, D. Crichton, C. Mattmann, C. Norton, and E. Kay-Im. Presented at the 8th Earth Science Data Systems Working Group (ESDSWG) Conference Poster Session. Wilmington, DE, October 20th-22nd, 2009.
45. *A Reusable Process Control System Architecture for the Orbiting Carbon Observatory and NPP Sounder PEATE missions*. C. Mattmann. Section 388 Instrument and Science Data Systems Technical Seminar. Pasadena, CA September 17, 2009.
46. *Earth and Environmental Sciences Panel*. Speakers: P. Fox, N. Oza, and C. Mattmann. 3rd Extremely Large Databases Workshop (XLDB3), Lyon, France, August 28th-29th, 2009.
47. *A Reusable Process Control System Framework for the Orbiting Carbon Observatory and NPP Sounder PEATE missions*. C. Mattmann, D. Freeborn, D. Crichton, B. Foster, A. Hart, D. Woollard, S. Hardman, P. Ramirez, S. Kelly, A. Y. Chang, C. E. Miller. Presented at the 3rd IEEE Intl' Conference on Space Mission Challenges for Information Technology (SMC-IT 2009), Pasadena, CA, July 19 - 23, 2009.
48. *JPL's Global Change and Energy IT Architecture*. C. Mattmann, D. Crichton. Presented at the IT for Climate Research Workshop held in conjunction with the 3rd IEEE Intl' Conference on Space Mission Challenges for Information Technology (SMC-IT 2009), Pasadena, CA, July 19 - 23, 2009.

49. *A Virtual Oceanographic Data Center*. S. McCleese, C. Mattmann, R. Raskin, D. Crichton, S. Hardman. Presented at the 18th ACM/IEEE International World Wide Web Conference (WWW2009) – Developers Track, Madrid, Spain, April 24th, 2009.
50. *An Architecture-based Framework For Understanding Large-Volume Data Distribution*. C. Mattmann. Presented at the USC CSE Annual Research Review (ARR), March 17th, Los Angeles, CA 2009.
51. *A Service Oriented Architecture for Highly Distributed and Data-Intensive Geospatial Grid Software Systems*. C. Mattmann, R. Raskin, D. Crichton. Presented at the GIScience 2008 Workshop on Design of Service-Oriented Architecture (SOA) for Geospatial Science, Park City, UT, September 23, 2008.
52. *Facilitating Distributed Climate Modeling Research and Analysis via the Climate Data eXchange*. D. Crichton, C. Mattmann, A. Braverman. Presented at the Global Organization for Earth System Science Portals (GO-ESSP) 2008 Workshop, Seattle, WA, September 17-19, 2008.
53. *A Model Driven Architecture for Highly Distributed, Data Intensive Systems*. D. Crichton, P. Ramirez, C. Mattmann and J. S. Hughes. Presented at the DARPA Workshop on Digital Object Storage and Retrieval (DOSR), Chantilly, Virginia, July 15-16, 2008.
54. *Apache Tika -An extensible, configurable content-analysis framework*. J. Zitting, C. Mattmann. Presented at the ApacheCon US 2007, November 15, 2007, Atlanta, GA, 2007.
55. *A Reference Framework for Requirements and Architecture in Biomedical Grid Systems*. C. Mattmann, V. Perrone, S. Kelly, D. Crichton, A. Finkelstein, N. Medvidovic. Presented at the 2007 IEEE International Conference on Information Integration and Reuse (IRI-2007), August 15th, Las Vegas, NV, 2007.
56. *DISCO: A Framework for Classification and Selection of Software Connectors for Highly Distributed and Voluminous Data-intensive Systems*, C. Mattmann, D. Woollard, N. Medvidovic, T. Johns, R. Mahjourian. Presented at the 2007 UC Irvine ISR Research Forum, June 1, Irvine, CA, 2007.
57. *Software Connector Classification and Selection for Data-intensive Systems*, C. Mattmann, D. Woollard, N. Medvidovic, R. Mahjourian. Presented at the 2nd International Workshop on Incorporating COTS Software into Software Systems: Tools and Techniques (IWICSS), May 22nd, Minneapolis, MN, 2007.
58. *A Framework for the Assessment and Selection of Software Components and Connectors in COTS-based Architectures*, C. Mattmann, J. Bhuta. Presented at the 2nd International Workshop on Incorporating COTS Software into Software Systems: Tools and Techniques (IWICSS), May 22nd, Minneapolis, MN, 2007.
59. *A Framework for the Assessment and Selection of Software Components and Connectors in COTS-based Architectures*, J. Bhuta, C. Mattmann. Presented at the USC CSE Annual Research Review (ARR), February 13th, Los Angeles, CA 2007.
60. *A Distributed Information Services Architecture to Support Biomarker Discovery in Early Detection of Cancer*, D. Crichton, S. Kelly, C. Mattmann, Q. Xiao, J. S. Hughes, J. Oh, M. Thornquist, D. Johnsey, S. Srivastava, L. Esserman, B. Bigbee. Presented at the 2nd IEEE International Conference on e-Science and Grid Computing, December 4th, Amsterdam, the Netherlands, 2006.
61. *A Framework for Selecting Large-scale, Distributed, Data-intensive Software Connectors*. C. Mattmann, N. Medvidovic, and D. Crichton. Presented at the 2006 UC Irvine ISR Research Forum, June 2, Irvine, CA, 2006.
62. *A Software Architecture-based Framework for Highly Distributed and Data Intensive Scientific Applications*. C. Mattmann, D. Crichton, N. Medvidovic, and S. Hughes. Presented at the 28th ACM/ IEEE International Conference on Software Engineering (ICSE) Software Engineering Achievements and Challenges Track. May 24th, Shanghai, China, 2006.

63. *A Classification and Evaluation of Data Movement Technologies for the Delivery of Highly Voluminous Scientific Data Products*. C. Mattmann, S. Kelly, D. Crichton, J. S. Hughes, S. Hardman, P. Ramirez and R. Joyner. Presented at the NASA/IEEE Conference on Mass Storage Systems and Technologies. May 16th, College Park, MD, 2006.
64. *Tera/Petabyte Data Distribution Architectures*. C. Mattmann. Presented at the USC CSE Annual Research Review (ARR), March 14th, Los Angeles, CA 2006.
65. *Software Connectors for Highly Distributed and Voluminous Data-intensive Systems*. C. Mattmann. Qualifying Exam Presentation, University of Southern California, January 20th, Los Angeles, CA, 2006.
66. *The Movement Towards Grid Architectures in Planetary Science*. D. Crichton, J. S. Hughes and C. Mattmann. Presented at the 14th Global Grid Forum (GGF-14), June 26th-29th, Chicago, IL, 2005.
67. *A Light-weight, Event-based, Grid Infrastructure for Data-intensive Environments*. C. Mattmann, N. Medvidovic, D. Crichton, S. Malek, M. Mikic-Rakic, N. Beckman. Presented at the 2005 UC Irvine ISR Research Forum, June 3, Irvine, CA, 2005.
68. *Unlocking the Grid*. C. Mattmann, N. Medvidovic, P. Ramirez and V. Jakobac. Presented at the 8th ACM SIGSOFT Symposium on Component-based Software Engineering (CBSE8), May 15th, St. Louis, MO, 2005.
69. *Leveraging Architectural Models to Inject Trust into Software Systems*. S. Banerjee, C. Mattmann, N. Medvidovic, and L. Golubchik. Presented at the 2005 ICSE Workshop on Software Engineering for Secure Systems (SESS05), May 15th, St. Louis, MO, 2005.
70. *A Grid-based Lightweight Infrastructure for Data-intensive Environments*. C. Mattmann, S. Malek, N. Beckman, M. Mikic-Rakic, N. Medvidovic and D. Crichton. Presented at the USC CSE Annual Research Review (ARR), Los Angeles, CA 2005.
71. *GLIDE: A Grid-based, Lightweight Infrastructure for Data-intensive Environments*. C. Mattmann, S. Malek, N. Beckman, M. Mikic-Rakic, N. Medvidovic and D. Crichton. Presented at the 2005 European Grid Conference, Amsterdam, the Netherlands, February 2005.
72. *ACE: Improving Search Engines via Automatic Concept Extraction*. P. Ramirez and C. Mattmann. Presented at the 5th IEEE Conference on Information Reuse and Integration (IEEE-IRI-2004). Las Vegas, NV, November 2004.
73. *Software Architecture for Large-scale, Distributed, Data-Intensive Systems*. C. Mattmann, D. Crichton, J. S. Hughes, S. Kelly and P. Ramirez. Presented at the 4th IEEE/IFIP Working Conference on Software Architecture (WICSA-4), Oslo, Norway, June 2004.
74. *An Architectural Style for Highly Data-Intensive Systems*. C. Mattmann, D. Crichton and N. Medvidovic. Presented at the 2004 UC Irvine ISR Research Forum, Irvine, CA, June 2004.
75. *Packaging Data Products using Data Grid Middleware for Deep Space Mission Systems*. C. Mattmann, P. Ramirez, D. Crichton and J.S. Hughes. Presented at the 8th International Conference on Space Operations (Spaceops-2004), Montreal, Canada, May 2004.
76. *The Grid and Information Architecture*. C. Mattmann, D. Crichton, J.S. Hughes. Presented at Consultative Committee for Space Data Systems (CCSDS) Information Architecture Working Group, Montreal, Canada, May 2004.
77. *A Roadmap for Tool Support in Space Data System Software Architectures*. C. Mattmann, D. Crichton, J.S. Hughes. Presented at Consultative Committee for Space Data Systems (CCSDS) Information Architecture Working Group, Montreal, Canada, May 2004.
78. *A Software Architecture for Highly Data-Intensive Systems*. C. Mattmann. Presented at the USC CSE Annual Research Review (ARR), Los Angeles, CA 2004
79. *A Data Grid Framework for Managing Planetary Science Data*. D. Crichton, J.S. Hughes, C. Mattmann. Presented to the Center for Applied Scientific Computing (CASC) at Lawrence Livermore National Laboratory (LLNL), Livermore, California, December 2003.

80. *Towards a Distributed Information Architecture for Avionics Data*. C. Mattmann, D. Freeborn, and D. Crichton. Presented at the 2nd IADIS International Conference WWW/Internet, Algarve, Portugal, November 2003
81. *Tool Support for Modeling Space Data System Software Architectures*, C. Mattmann, D. Crichton, and J.S. Hughes. Presented at Consultative Committee for Space Data Systems (CCSDS) Information Architecture BOF (Birds of a Feather), Columbia, Maryland, October 2003.
82. *A Distributed Data Architecture for Mars Odyssey Data Distribution*, D. Crichton, J.S. Hughes, C. Mattmann. Presented to Center for Grid Technologies, Information Sciences Institute, Marina Del Rey, CA August 2003.

## MENTORING

### **JPL High School Summer Student Program - 2011**

Jesslyn Whittell

Jet Propulsion Laboratory Summer Student

Advised with assistance from: Paul Ramirez, JPL, Cameron Goodale, JPL, Andrew F. Hart, JPL, and Dan Crichton, JPL

Sponsored by: NASA Earth Science Data System Software Reuse WG and Early Detection Research Network (EDRN) project

### **Southern California Bioinformatics Summer Institute (So Cal BSI) - 2009**

Andrew Clark

Jet Propulsion Laboratory Summer Student

Advised with assistance from: Andrew F. Hart, JPL, and Dan Crichton, JPL

Sponsored by: National Science Foundation and the National Institutes of Health

### **Southern California Bioinformatics Summer Institute (So Cal BSI) - 2004**

Ronny Chan

Kim Ngo

Jet Propulsion Laboratory Summer Students

Co-advised with: Dr. Tina Xiao, JPL, Roshanak Roshandel, JPL, Paul Ramirez, JPL, Dan Crichton, JPL

Sponsored by: National Science Foundation and the National Institutes of Health

## PROFESSIONAL SERVICE

### **Program Committee Membership**

1. Program Committee, Meaningful Use of Complex Medical Data (MUCMD) Symposium, August 26-27 2011 Children's Hospital Los Angeles, Saban Auditorium.
2. Program Committee Member, IEEE International Workshop on the Future of Software Engineering for/in the Cloud (FoSEC), Washington DC, USA, July 4-9, 2011.
3. Program Committee Member, IT for Climate Research Workshop at the 3rd IEEE Intl' Conference on Space Mission Challenges for Information Technology (SMC-IT 2009), Pasadena, CA, July 19 - 23, 2009.
4. Program Committee Member, 18th Intl' WWW Conference (Developer's Track), Madrid, Spain, April 2009.
5. Program Committee Member, 34th Euromicro Conference, Special Session on Software Architecture for Pervasive Systems (SAPS), Parma, Italy, September 2008.
6. Program Committee Member, 2007 ISR Graduate Student Research Symposium, Irvine, CA, June 2007.

### **Conference/Workshop Organization**

1. Co-Organizer, IN30: Software Reuse and Open Source Software in Earth Science Oral Session at the American Geophysical Union (AGU) Fall 2011 Meeting, San Francisco, CA, December 5-9, 2011.
2. Track Chair, Apache in Space! (OODT) Track, ApacheCon NA 2011, Vancouver, CA, November 9, 2011.
3. Session Chair, IEEE IRI Workshop on Issues and Challenges in Social Computing (WICSOC 2011), Las Vegas, NV, August 2, 2011.
4. Lead Organizer, ICSE 2011 Workshop on Software Engineering for Cloud Computing (with Nenad Medvidovic, T. S. Mohan and Owen O'Malley). 33rd Intl' Conference on Software Engineering (ICSE 2011), Honolulu, HI, May 21-28, 2011.
5. Co-Organizer, IN04 Experiences and Challenges in Earth Science Software Reuse Poster Session at the American Geophysical Union (AGU) Fall 2010 Meeting, San Francisco, CA, December 13-17, 2010.
6. Organizer, Chair, 9th NASA Earth Science Data System Working Group Meetings Software Reuse Breakout, New Orleans, Louisiana, October 21-22, 2010.
7. Organizer, Chair, 9th NASA Earth Science Data System Working Group Meetings Open Source Breakout, New Orleans, Louisiana, October 20, 2010.
8. Organizer, NASA Earth Science Data Systems (ESDS) Software Reuse Working Group Workshop on Reuse Readiness Levels. Washington D.C., April 7, 2010.
9. Co-Organizer, IT for Climate Research Workshop at the 3rd IEEE Intl' Conference on Space Mission Challenges for Information Technology (SMC-IT 2009), Pasadena, CA, July 19 - 23, 2009.
10. Webmaster, 2005 Working IFIP/IEEE Conference on Software Architecture (WICSA)

### **Referee and Reviewer Service**

1. Reviewer, Meaningful Use of Complex Medical Data (MUCMD) Symposium, 2011.
2. Reviewer, Earth Science Informatics, 2011.
3. Reviewer, IEEE Transactions on Education, 2011, 2012.
4. Reviewer, IEEE International Workshop on the Future of Software Engineering for/in the Cloud (FoSEC), 2011.
5. Reviewer, Software Quality Journal, 2011.
6. Reviewer, The Computer Journal, 2011.
7. Reviewer, IEEE Military Communications Conference (MILCOM), 2010.
8. Reviewer, IEEE Transactions on Software Engineering (TSE), 2010, 2011.
9. Reviewer, IEEE Intl' Conference on Information Integration and Reuse – Journal Special Issue, 2009.
10. Reviewer, Journal of Software Engineering and Robotics (JOSER), 2009, 2010.
11. Reviewer, Journal of Software and System Modeling (SoSyM), 2009.
12. Reviewer, NASA Earth Science Data System Working Group (ESDSWG) Software Reuse Peer Award, Utilization Category, 2009.
13. Reviewer, IEEE Journal of Selected Topics in Earth Observations and Remote Sensing, 2009, 2010.
14. Reviewer, IEEE Transactions on Dependable and Secure Computing, 2008, 2010.
15. External Reviewer, 23rd IEEE/ACM International Conference on Automated Software Engineering (ASE), 2008.

16. Reviewer, 34th Euromicro Special Session on Software Architecture for Pervasive Systems (SAPS), 2008.
17. Reviewer, Wiley Encyclopedia of Computer Science and Engineering, 2008.
18. Reviewer, Journal of Systems and Software Special Section on Software Architecture, 2008.
19. Reviewer, ACM Computing Reviews, 2007, 2008, 2009
20. External Reviewer, 7th IFIP/IEEE Working Conference on Software Architecture, 2007
21. Reviewer, IBM Systems Journal, 2007.
22. Reviewer, 2007 ISR Graduate Student Research Symposium, Irvine, CA, June 2007.
23. External Reviewer, 3rd Intl' Conference on the Quality of Software-Architectures, 2007.
24. External Reviewer, 10th Intl' Symposium on Component-based Software Engineering, 2007.
25. External Reviewer, 1st IEEE Intl' Conf. on Self-Adaptive and Self-Organizing Systems, 2007.
26. External Reviewer, ICSE07 SHARK ADI Workshop, 2007.
27. External Reviewer, Journal of Systems and Software Special Section on Software Architecture, 2006.
28. External Reviewer, 6th Working IFIP/IEEE Conference on Software Architecture, 2006 .
29. External Reviewer, 9th Intl Symposium on Component-based Software Engineering, 2006.
30. External Reviewer, 3rd Intl Working Conference on Component Deployment, 2005 .
31. External Reviewer, 5th Intl Workshop on Software Engineering and Middleware, 2005.
32. External Reviewer, 9th Intl Software Product Line Conference, 2005.
33. External Reviewer, 8th Intl Symposium on Component-based Software Engineering, 2005.
34. Reviewer, IEEE Software, 2004, 2005.
35. External Reviewer, FSE-12 Workshop On Self-managing Systems (WOSS), 2004.
36. External Reviewer, UML04 Workshop on Software Architecture Description and UML, 2004.
37. External Reviewer, Workshop on Architecting Dependable Systems, 2004.
38. Reviewer, Journal of Autonomous Agents and Multi-agent Systems 2003 , 2011, 2012.

#### **Other**

1. Proceedings Contributor to DBLP bibliography server (WICSA-4, ICWI2003, IEEE-IRI 2004)

#### **ADVISORY**

#### **Completed**

1. NASA Small Business Innovation Research/Small Business Technology Transfer (SBIR/SBTT) Phase I Proposal Reviewer, October 2011.
2. NASA Small Business Innovation Research/Small Business Technology Transfer (SBIR/SBTT) Phase I Proposal Reviewer, October 2010.
3. Defense Advanced Research Projects Agency (DARPA), Digital Object and Storage Retrieval (DOSR) program, 2008-2010.
4. National Institutes of Health (NIH), National Institute's of Allergies and Infectious Disease (NIAID) Microbiology and Infectious Diseases Biological Resource Repository (BRR) Proposal Review Panel, 2009.
5. NASA Small Business Innovation Research/Small Business Technology Transfer (SBIR/SBTT) Phase I Proposal Reviewer, October 2009.
6. National Science Foundation (NSF), Panel Review, June, 2009.

7. NASA Jet Propulsion Laboratory (JPL), Strategic University Partnership (SURP) Program Proposal Review Panel, 2009.
8. National Institutes of Health (NIH), National Institute's of Allergies and Infectious Disease (NIAID) Adjuvant Development Program Proposal Review Panel, 2008.
9. National Institutes of Health (NIH), National Institute's of Allergies and Infectious Disease (NIAID) DMID Regulatory Affairs Support Proposal Review Panel, 2008.

PROFESSIONAL ASSOCIATIONS      Senior Member, Institute of Electrical and Electronics Engineers, Inc. (IEEE)  
Member, Apache Software Foundation (ASF)  
Member, ACM Special Interest Group on Software Engineering (SIGSOFT)  
Participant (via JPL), Consultative Committee on Space Data Systems (CCSDS)

COMPUTER SKILLS      • Languages: Java, C/C++, Perl, Python, SQL, XML, HTML, JavaScript, VBScript, ASP, JSP, PHP  
• Applications: L<sup>A</sup>T<sub>E</sub>X, common Windows database, spreadsheet, and presentation software, Adobe Photoshop, Adobe Framemaker, Subversion, CVS, ViewVC, JIRA, Confluence, Maven, Ant, Junit  
• Operating Systems: Windows, Solaris, Unix (particular experience with FreeBSD), Linux (experience with RedHat).

REFERENCES              Available upon Request

CITIZENSHIP             United States Citizen