



Nicholas Del Rio

Education

- 1999–2004 **B.S.**, *University of Texas at El Paso*, 2.7/4.0.
2004–2007 **M.S.**, *University of Texas at El Paso*, 4.0/4.0.
2008–2013 **Ph.D.**, *University of Texas at El Paso*, 4.0/4.0.

Doctoral thesis

- title *A Declarative Domain-Independent Approach for Querying and Generating Visualizations*
supervisor Paulo Pinheiro da Silva
description Presents a query language that can be automatically translated into visualization pipelines, thereby increasing the accessibility of visualization toolkits to non-experts

Master thesis

- title *Provenance Support for Quality Assessment of Scientific Results: A User Study*
supervisor Paulo Pinheiro da Silva
description Presents a quantitative user evaluating the efficacy of provenance visualization with regards to helping scientists discriminate between high and low quality contour maps

Refereed Publications

Conference and Workshop Papers

Paulo Pinheiro da Silva, Nicholas Del Rio, Deborah L McGuinness, Li Ding, Cynthia Chang, and Geoff Sutcliffe. User interfaces for portable proofs. In *8th International Workshop On User Interfaces for Theorem Provers*. 2008.

Paulo Pinheiro Da Silva, Deborah McGuinness, Nicholas Del Rio, and Li Ding. Inference web in action: Lightweight use of the proof markup language. In *The Semantic Web-ISWC 2008*, pages 847–860. Springer Berlin Heidelberg, 2008.

Paulo Pinheiro Da Silva, Leonardo Salayandia, Nicholas Del Rio, and Ann Q Gates. On the use of abstract workflows to capture scientific process provenance. *Proceedings of the 2nd conference on Theory and practice of provenance*, pages 10–10, 2010.

Paulo Pinheiro da Silva, Geoff Sutcliffe, Cynthia Chang, Li Ding, Nicholas Del Rio, and Deborah L McGuinness. Presenting tstp proofs with inference web tools. *PAAR/ESHOL*, 373, 2008.

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Nicholas Del Rio and Paulo Pinheiro Da Silva. Probe-it! visualization support for provenance. In *Advances in Visual Computing*, pages 732–741. Springer Berlin Heidelberg, 2007.

Nicholas Del Rio and Paulo Pinheiro da Silva. Capturing and using knowledge about the use of visualization toolkits. In *2012 AAAI Fall Symposium Series*, 2012.

Nicholas Del Rio, Paulo Pinheiro da Silva, and Q Ann. Gates, and leonardo salayandia. semantic annotation of maps through knowledge provenance. *Proceedings of the Second International Conference on Geospatial Semantics (GeoS 2007)*, pages 29–30, 2007.

Nicholas Del Rio, Natalia Villanueva-Rosales, Deana Pennington, Karl Benedict, Aimee Stewart, and CJ Grady. Elseweb meets sadi: Supporting data-to-model integration for biodiversity forecasting. *Discovery Informatics Symposium*, 2013.

James Michaelis, Li Ding, Zhenning Shangguan, Stephan Zednik, Rui Huang, Paulo Pinheiro Da Silva, Nicholas Del Rio, and Deborah L McGuinness. Towards usable and interoperable workflow provenance: Empirical case studies using pml. In *SWPM*, 2009.

Paulo Pinheiro da Silva, Nicholas Ricky Del Rio, Vladik Kreinovich, and Alejandro Castaneda. Trustmap: Towards trust recommendations for maps. In *Terra Cognita*, 2008.

Nicholas Rio, PauloPinheiro Silva, and Hugo Porras. Browsing proof markup language provenance: Enhancing the experience. In DeborahL. McGuinness, JamesR. Michaelis, and Luc Moreau, editors, *Provenance and Annotation of Data and Processes*, volume 6378 of *Lecture Notes in Computer Science*, pages 274–276. Springer Berlin Heidelberg, 2010.

Nicholas Del Rio, Paulo Pinheiro da Silva, and Raed Aldouri. Identifying and explaining map quality through provenance: A user study. In Thomas Roth-Berghofer, Nava Tintarev, and David B. Leake, editors, *ExaCt*, pages 110–117, 2009.

Journal Articles

Peter Fox, Deborah L McGuinness, P Pinheiro da Silva, S Zednik, J Garcia, L Ding, N Del Rio, and C Chang. Semantic provenance for image data processing. *Proceedings of Geoinformaitcs*, 2008.

AQ Gates, P Pinheiro da Silva, L Salayandia, O Ochoa, A Gandara, and ND Rio. Use of abstraction to support geoscientistsúnderstanding and production of scientific artifacts. *Geoinformatics: Cyberinfrastructure for the Solid Earth Sciences*, G. Keller and C. Baru, Eds. Cambridge University Press, To appear, 2009.

Paulo Pinheiro da Silva, Aaron A Velasco, Martine Ceberio, Christian Servin, Matthew G Averill, Nicholas Ricky Del Rio, Luc Longpré, and Vladik Kreinovich. Propagation and provenance of probabilistic and interval uncertainty in cyberinfrastructure-related data processing and data fusion. 2007.

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Abstracts

N Del Rio, DD Pennington, KK Benedict, N Villanueva-Rosales, WB Hudspeth, S Scott, AM Stewart, and C Grady. Leveraging industry-standard metadata to populate a semantic registry suitable for the model web. *AGU Fall Meeting Abstracts*, 1:1595, 2013.

N Del Rio and P Pinheiro da Silva. Leveraging an esip data-type ontology to support visualization. *AGU Fall Meeting Abstracts*, 1:0660, 2010.

N Del Rio, P Pinheiro da Silva, GG Leptoukh, and C Lynnes. Towards infusing giovanni with a semantic and provenance aware visualization system. *AGU Fall Meeting Abstracts*, 1:1445, 2011.

P Fox, DL McGuinness, P Pinheiro da Silva, S Zednik, N Del Rio, L Ding, P West, and C Chang. Knowledge provenance in science data pipelines; languages, tools and artifacts-what can we now answer? *AGU Spring Meeting Abstracts*, 1:06, 2009.

Deborah L McGuinness, Peter Fox, P Pinheiro da Silva, S Zednik, Nick Del Rio, Li Ding, Patrick West, and Cynthia Chang. Annotating and embedding provenance in science data repositories to enable next generation science applications. *AGU Fall Meeting Abstracts*, 1:1052, 2008.

DD Pennington, N Del Rio, C Fierro, A Gandara, A Garcia, J Garza, M Giandoni, O Ochoa, E Padilla, and S Salamah. The virtual learning commons: An emerging technology for learning about emerging technologies. *AGU Fall Meeting Abstracts*, 1:01, 2013.

P Pinheiro da Silva, N Del Rio, and GG Leptoukh. Declarative visualization queries. *AGU Fall Meeting Abstracts*, 1:1428, 2011.

Experience

Professional

2013–present **Postdoctoral Research Associate**, *University of Texas at El Paso*.

Accomplishments:

- Investigated and developed techniques for automating data discovery, transformation, and integration of spatial data with Model Web services
- Developed GIS data service ontologies built from Linked Open Data (LOD) standards
- Developed Model Web service ontologies built from LOD standards
- Investigated methods for linking data service ontologies with Model Web service ontologies
- Disseminated results to peer-reviewed conferences and to NASA ESDSWG working groups
- Mentored and guided research conducted by graduate and undergraduate students
- Presented work at ESIP semantic cluster teleconferences and ESDSWG working group meetings

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2011 **Intern, NASA Goddard Space Flight Center, Greenbelt, MD.**

Accomplishments:

- Investigated and develop techniques for integrating my visualization dissertation work (VisKo) into Goddard Earth Sciences Giovanni system
- Evaluated and report on the usability of the Giovanni system
- Presented of my dissertation work to the Goddard Earth Science Distributed Active Archive Center (DAAC)
- Presented my VisKo/Giovanni integration findings with other NASA interns
- Investigated how to capture provenance associated with visualization generation in Giovanni

2007–2013 **Research Associate, University of Texas at El Paso.**

Accomplishments:

- Investigated and developed visualization service capability models inspired by industry-proven modular visualization environments
- Developed a framework for registering visualization services with a knowledge base structured according to my visualization service capability models
- Constructed a query language that can express visualization (i.e., view) requirements
- Developed of a visualization query-planning algorithm that translates visualization queries into executable pipelines
- Designed an experiment to assess the write/readability of visualization queries
- Deployed my developed visualization framework at NASA and Pacific Northwest National Laboratory (PNNL)
- Disseminated results to peer-reviewed conferences

2004–2007 **Research Assistant, University of Texas at El Paso.**

Accomplishments:

- Developed techniques for capturing Proof Markup Language (PML) based provenance associated with generating seismic tomographic velocity models and gravity contour maps
- Investigated methods for visualizing PML traces on the Web
- Designed experiments for evaluating the efficacy of using my provenance visualization to identify errors in the generation gravity contour maps

Computer skills

Programming Languages	Java, Prolog, Python, C#
Visualization	Visualization Toolkit (VTK), Generic Mapping Tools (GMT), NCAR Command Language (NCL), Data Driven Documents (D3)
Semantic Web	Web Ontology Language (OWL), Resource Document Framework (RDF), SPARQL, OWL-API, Jena
Linked Data	Data Catalog (DCAT), Extensible Environmental Ontology (OBOE), Simple Knowledge Organization System (SKOS), Provenance Ontology (Prov-O), Virtuoso

Lecturing Experience

Programming Languages	Functional programming with an emphasis on Haskell
Advanced Databases	OWL, SPARQL, and Semantic Services
Databases	Views, Stored Procedures/Functions, Indexes, and Transactions

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Mentoring Experience

- Joshua Grajeda Guided the design and development of a Prov-O visualization system based on D3
- Edgar Padilla Oversaw the design and development of an API for adding project information to a Virtuoso triplestore. This work served as part of his requirements for a Master in Software Engineering at the University of Texas at El Paso.
- Josh Grajeda Oversaw the design and development of a D3 visualization framework for constructing Project-to-Project, Person-to-Person, and Person-to-Project visualizations. This work served as part of his requirements for a Master in Software Engineering at the University of Texas at El Paso

References

- Deana Pennington: ddpennington@utep.edu, 915 - 747 - 5867
- Paulo Pinheiro da Silva: pp3223@gmail.com
- Ann Q. Gates: agates@utep.edu, 915 - 747 - 7689
- Natalia Villanueva-Rosales: nvillanuevarosales@utep.edu, 915 - 747 - 8643

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