

**Daniel L. Megenhardt**

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**Education**

BS in Meteorology/Math minor, May 1993

Metropolitan State College of Denver

**Relevant Course work**

Programming in C++, 2006

4 credit hours

Front Range Community College

**Experience**

08/2009 – present     Software Engineer / Programmer III

04/2005 – 08/2009     Software Engineer / Programmer II

08/2004 – 04/2005     Software Engineer / Programmer I

National Center for Atmospheric Research

Research Applications Laboratory

- *Planning, design, development, installation, and maintenance of forecasting systems.* These systems run on multiple linux hosts. Some of these systems were comprised of more than 150 processes, run continuously on as many as 11 linux hosts, with more than 100 different data outputs produced. My responsibilities include, but are not limited to:
  - Time, hardware, and cost estimates
  - Configuration
    - establishing cross-mounts
    - ssh passwordless communication between hosts
    - defining data hierarchy
    - managing data distribution and cleanup
    - creating a system monitor
    - customizing window managers
    - load balancing
    - LDM data acquisition setup
  - Monitoring
  - Problem solving of data, system, and code complications
  - Communication with outside users
- *Technology transfer of forecast systems to outside organizations.* This involved producing library and application packages, documentation, system diagrams, and instructions. I also provide support during the installation and testing phase of the system. Some of the tasks include:
  - Installation support
  - Trouble shooting installation problems
  - Support of data acquisition
  - Training and documentation
- *Developing applications in support of research in atmospheric science.* Some of the skills and work involved were:
  - Develop code to ingest multiple data types, i.e. NetCDF, Grib, Mdv
  - Develop data quality applications
  - Developed display GUI's using QT, and the Python Tkinter package
  - Designed and developed real-time system simulation applications
  - Development of scientific analysis applications

- Automation using scripting languages
- *Documenting systems for engineering support and training of end users.* Some of the ways this was accomplished are:
  - Use of doxygen for in-code documentation
  - Provide detailed system diagrams
  - Write GUI driven simulation tools
  - In-person training

04/1998 – 08/2004 Associate Scientist II

02/1994 – 04/1998 Associate Scientist I

National Center for Atmospheric Research  
Research Applications Program

- *Assisted in the research and development of convective forecast systems.* These systems utilized observational and model data sets to forecast convective initiation, growth, and decay. Key observation components were radar, satellite, and mesonet data. Examples of the type of work I performed are:
  - Development of forecast extrapolation techniques
  - Visiting end-users to get feedback on usability of the systems and to understand user requirements
  - Testing and configuring algorithms
  - Algorithm development
  - Data processing and management
  - *Writing perl scripts to automate processing*
- *Wrote papers and gave oral and poster presentations at conferences.* Also co-authored peer-reviewed journal papers and numerous conference papers.

05/1990 – 02/1994 Student Assistant

National Center for Atmospheric Research  
Research Applications Program

- *Assisted scientists with their atmospheric research.* This was a part time position during the school year and full time over winter and summer breaks. The bulk of the research was in the utilization of observational data to further the understanding of convective weather. My tasks included:
  - dual-doppler analysis
  - atmospheric sounding analysis
  - radar data editing
  - field project support: weather balloon launching and storm chasing
  - figure design for scientific papers.

## **Skills And Qualifications**

### System design and Evaluation

- Sequential development processes
  - Initial concept, requirements analysis, and initial design
- Iterative prototyping
  - User testing and feedback
- Flow diagrams for software and system design

### Programming languages and tools

- C++/C: Multiple inheritance, operator overloading, memory management, public protected and private members and methods.
- python: Tkinter GUI
- perl
- php
- shell scripts

- emacs code editor
- gdb, DDD debugging tools
- doxygen

#### Software packages used

- Microsoft word, and Powerpoint
- Adobe illustrator, Photoshop, and Dreamweaver.

#### Operating systems:

- Linux: Also familiar with installation and system administration.
- MAC OSX

#### Personality strengths:

- Methodical and analytical problem solving skills
- Excellent Communication skills
- Work well with a team
- Driven, self-motivated, independent worker

#### **Awards**

U.S. Department of Commerce Certificate of Recognition for efforts in transferring the Auto-nowcaster code and tools to the National Weather Service (NWS) Meteorological Development Laboratory (MDL), 2008

#### **Publications**

Cai, H., C. Kessinger, D. Ahijevych, J. Williams, N. Rehak, D. Megenhardt, M. Steiner, R. L. Bankert, J. Hawkins, M. F. Donovan, E. R. Williams, 2009: Nowcasting oceanic convection for aviation using random forest classification. *16th Conference on Satellite Meteorology and Oceanography*, Phoenix, AZ.

Donovan, M., E. Williams, C. Kessinger, N. Rehak, H. Cai, D. L. Megenhardt, R. L. Bankert, and J. D. Hawkins, 2009: An Evaluation of a Convection Diagnosis Algorithm over the Gulf of Mexico Using NASA TRMM Observations. *16th Conference on Satellite Meteorology and Oceanography*, Phoenix, AZ.

Kessinger C., H. Cai, N. Rehak, D. Megenhardt, M. Steiner, R. Bankert, J. Hawkins, M. Donovan and E. Williams, 2009: The oceanic convection diagnosis and nowcasting system. *16th Conference on Satellite Meteorology and Oceanography*, Amer. Meteor. Soc., Phoenix, AZ, 12-15 Jan. 2009.

Steiner, M., R. E. Bateman, D. L. Megenhardt, and J. O. Pinto, 2009: Evaluation of Ensemble-based Probabilistic Weather Information for Air Traffic Management. *14<sup>th</sup> Conference on Aviation, Range and Aerospace Meteorology Special Symposium on Weather – Air Traffic Management Integration*, Amer. Meteor. Soc., Phoenix, Arizona, 4.3, 12 pp.

Ba, Mamoudou Bocar, S. Smith, S. O'Donnell, K. Sperow, X. Tan, R. D. Roberts, T. Saxen, D. Albo, S. J. Fano, and D. Megenhardt, 2008: Transitioning NCAR's Autonowcast System Capability Into NWS Operations. *13th conference on Aviation, Range and Aerospace Meteorology*, American Meteorological Society, New Orleans, LA.

Bateman, Richard E., M. Steiner, D. Megenhardt, C. Phillips, and J. Pinto: 2008: Determination of the Predictability of aviation-relevant Characteristics of convective Weather. *13th Aviation, Range and Aerospace Meteorology Conference*, American Meteorological Society, New Orleans, LA, 21-24 Jan 2008.

Cai, H., R. Kuligowski, G. Lee, N. Rehak, G. Cuning, D. Albo, D. Megenhardt and M. Steiner, 2008: Brightness temperature nowcasting for satellite-based short-term prediction of storms: opportunities and challenges, *Proc. SPIE*, Vol. 7088, 708807 (2008); DOI:10.1117/12.795621.

Kessinger, C., M. Donovan, R. Bankert, E. Williams, J. Hawkins, H. Cai, N. Rehak, D. Megenhardt, and M. Steiner, 2008: Convection diagnosis and nowcasting for oceanic aviation applications, *Proc. SPIE*, Vol. 7088, 708808.

Cai, H., C. Kessinger, N. Rehak, and D. Megenhardt, 2008: Investigations of environmental conditions for storm initiation over the ocean using satellite data. *13th Conference on Aviation, Range and Aerospace Meteorology Conference*, American Meteorological Society, New Orleans, LA, 21-24 Jan 2008.

Kessinger, C. K., H. Cai, N. Rehak, D. Megenhardt, J. Hawkins, R. Bankert and E. Williams, 2008: Oceanic Convection Diagnosis and Nowcasting. *13th Conference on Aviation, Range and Aerospace Meteorology*, American Meteorological Society, New Orleans, LA.

Pinto, J., C. Kessinger, B. Hendrickson and D. Megenhardt, 2007: Storm Characterization and Short Term Forecasting Potential Using a Phased Array Radar. *Proceedings of the 33rd Conference on Radar Meteorology*, American Meteorological Society, Cairns, Australia.

Cai, H., R. Roberts, D. Megenhardt, E. Nelson and M. Steiner, 2007: Tackling the challenge of nowcasting elevated convection. *Proceedings of the 33rd Conference on Radar Meteorology*, American Meteorological Society, Cairns, Australia.

Harasti, P. R., M. Frost, Q. Zhao, J. Cook, L. J. Wagner, T. Maese, S. Potts, J. Pinto, D. Megenhardt, B. Hendrickson, and C. Kessinger, 2007: At-sea demonstration of the SPS-48E radar weather ex-traction capability. *Proceedings of the 33rd Conference on Radar Meteorology*, American Meteorological Society, Cairns, Australia.

Cai, H., R. Roberts, C. Mueller, T. Saxen, D. Megenhardt, M. Xu, S. Trier, E. Nelson, D. Albo, N. Rehak, S. Dettling and N. Oien, 2006: Enhancements of NCAR Auto-Nowcast System Using NRL, ASAP, MM5 and TAMDAR Data. *12th Aviation, Range and Aerospace Meteorology Conference*, American Meteorological Society, Atlanta, GA.

Kessinger, C., C. Mueller, H. Cai, G. Blackburn, N. Rehak, K. Levesque, B. Hendrickson, S. Carson and D. Megenhardt, 2006: Oceanic Convection Diagnosis and Nowcasting. *5<sup>th</sup> International Conference on Mesoscale Meteorology and Typhoon*, East Asia Weather Research Association, Boulder, CO, 31 Oct- 3 Nov 2006.

Nelson, E. J., S. Fano, R. Roberts, W. Bunting, T. Saxen, C. Mueller, H. Cai, A. Crook, D. Megenhardt, and J. Pinto, 2006: Evaluation of the NCAR Auto-Nowcaster during the NWS Ft. Worth Operational Demonstration. *Preprints, 32nd Conf. on Radar Meteo., Albuquerque, NM*, Amer. Meteo. Soc.

Roberts, R., S. Fano, W. Bunting, T. Saxen, E. Nelson, C. Mueller, D. Megenhardt, D. Albo, S. Dettling, A. Crook, N. Oien, H. Cai, K. Johnston, S. Smith, M. Ba, and T. Amis, 2005: The NWS/NCAR Man In The Loop (MITL) Nowcasting Demonstration: Forecaster Input into a Thunderstorm Nowcasting System. *Proc. WWRP Symp. Nowcasting & Very Short Range Forecasting*, Toulouse, France, 5-9 September, 7.26

Pinto, J., C. Mueller, S. Weygandt, D. Ahijevych, N. Rehak, and D. Megenhardt, 2005: Fusing

observation- and model-based probability forecasts for the short-term prediction of convection. *WWRP Symposium on Nowcasting and Very Short range Forecasting*, World Meteorological Organization, Toulouse, France, 4 pp.

Rehak, N., D. Megenhardt, and C.K. Mueller, 2004: Large-Scale Trending of Radar Data. *11th Conference on Aviation, Range, and Aerospace Meteorology*, Hyannis, MA.

Mueller, C. K., B. G. Brown, and D. Megenhardt, 2004: Probabilistic Forecasts of Convection: How do we do it? *20th Conference on Weather Analysis and Forecasting/16th Conference on Numerical Weather Prediction*, Seattle, WA.

Megenhardt, D. L., C. Mueller, S. Trier, D. Ahijevych, and N. Rehak, 2004: NCWF-2 Probabilistic Forecasts. *11th AMS Conference on Aviation, Range, and Aerospace Meteorology*, 5.2.

Mueller, C., and D. Megenhardt, 2003: Predictability of storm characteristics based on RUC environmental fields. *Preprints, 31st Conf. on Radar Meteo.*, Seattle, WA, Amer. Meteo. Soc.

Trier, S., D. Ahijevych, C. Davis, D. Megenhardt, C. Mueller, and N. Rehak, 2002: Enhancement of 0-3h forecasts of deep convection using mesoscale diagnostics derived from operational model analyses and forecasts. *International Conf. on Quantitative Precipitation Forecasting*, Reading, UK.

Megenhardt, D. and C. Mueller, 2002: Short-Term (0-2 hr) Automated Growth Forecast of Multi-cellular Convective Systems Associated with Large Scale, Daytime Forcing. *10th Conference on Aviation, Range, and Aerospace Meteorology*, Portland, OR.

Megenhardt, D., C. K. Mueller, N. Rehak, and G. Cunning, 2000: Evaluation of the National Convective Weather Forecast Product. *Preprints 9th Conference on Aviation, Range, and Aerospace Meteorology*, Amer. Met. Society, Orlando, Florida, Pp171-176.

Wilson, J. W., and D. L. Megenhardt, 1997: Thunderstorm initiation, organization and lifetime associated with Florida boundary layer convergence lines. *Mon. Wea. Rev.*, **125**, 1507-1525.

Wilson, J. W., D. L. Megenhardt, 1995: Radar characteristics of boundary layer convergence lines and convection initiation. *27th Conference on Radar Meteorology*, Vail, CO, pp. 479-481.

### **Presentations**

"NCWF-2 Probability Forecasts", *11th Conference on Aviation, Range, and Aerospace Meteorology*, 2004.

"Short-Term (0-2hr) Automated Growth Forecast of Multi-cellular Convective Systems Associated with Large Scale, Daytime Forcing", *10th Conference on Aviation, Range, and Aerospace Meteorology*, 2002.

"Evaluation of the National Convective Weather Forecast Product", *9th Conference on Aviation, Range, and Aerospace Meteorology*, 2000.

### **Community Involvement**

Weather presentation at Turner Middle School, Berthoud, CO, 2006, 2007

Career day presentations at Namaqua Elementary, Loveland, CO, 2005, 2006, 2007

Science Discovery and Fun Night, Berthoud Elementary, Berthoud, CO, 2005