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Tyler M. Bell

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Contact Info

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EDUCATION

August 2018 - December 2021

Ph.D. in Meteorology

University of Oklahoma - Norman, OK

- Advisor: Dr. Petra Klein
- Dissertation Title: Examining Novel Profiling Systems and Their Synergy for Advancing Boundary-Layer Research

August 2016 - August 2018

M.S. in Meteorology

University of Oklahoma - Norman, OK

- Advisor: Dr. Petra Klein
- Thesis Title: Analysis of Flow and Thermodynamic Characteristics at a Site in Complex Terrain

August 2012 - May 2016

B.S. in Meteorology

University of Oklahoma - Norman, OK

RESEARCH INTERESTS

Ground-based remote sensing, in-situ sensing, weather sensing unmanned aerial systems, atmospheric boundary layer processes, boundary layer profiling, turbulence, open-source development, flow in complex terrain, wind energy meteorology

PROFESSIONAL EXPERIENCE

Jan 2021 – Present

Research Scientist I

Cooperative Institute for High-Impact Weather Research and Operations (formerly CIMMS) – Norman, OK

Jan 2020 – Dec 2021

Research Associate I

Cooperative Institute for High-Impact Weather Research and Operations (formerly CIMMS) – Norman, OK

August 2018 – December 2019

Graduate Research Assistant

Center for Autonomous Sensing and Sampling – Norman, OK

August 2016 – August 2018

Graduate Research Assistant

Cooperative Institute for Mesoscale Meteorological Studies – Norman, OK

September 2015 – August 2016

Undergraduate Research Assistant

Cooperative Institute for Mesoscale Meteorological Studies – Norman, OK

September 2014 – August 2016

Undergraduate Research Assistant

Oklahoma Biological Survey – Norman, OK

November 2013 – August 2016

Student Meteorologist/Developer

DTN (formerly Weather Decision Technologies, Inc.) – Norman, OK

FIELD EXPERIENCE

May – June 2017 Perdigão

During this campaign, I assisted in the operation of the Collaborative Lower Atmospheric Mobile Profiling System (CLAMPS), a suite of instruments to profile the boundary layer, in the valley between two parallel ridges in Perdigao, Portugal to measure flow in complex terrain. I also assisted NCAR in launching radiosondes from inside the valley.

July 2018 LAPSE-RATE: Lower Atmospheric Profiling Studies at Elevation - A Remotely-Piloted Aircraft Team Experiment

I assisted in the deployment of CLAMPS in the San Luis Valley in Colorado in conjunction International Society for Atmospheric Research using Remotely Piloted Aircraft (ISARRA) flight week campaign. Additionally, I assisted the Center for Autonomous Sensing and Sampling in deploying state of the art boundary layer profiling Unmanned Areal Systems (UAS).

June 2019 and 2022 TORUS: Targeted Observations By Radars and UAS of Supercells

During the 2019 campaign, I assisted in multiple different missions. I contributed to software to help retrieve and process live data from a rapid deployment Doppler lidar system that measured winds in the inflow region of supercells. During the campaign, I also assisted in launching radiosondes from both the near-field and far-field inflow regions of the supercell.

February 2021 - Present VORTEX-USA UAS Damage Surveys

I often assist with gathering visible and multi-spectral imagery of damage to vegetation and structures caused by tornadoes in the SE US. One goal of this project is to investigate how classical damage indicators relate to damage caused to vegetation. Another goal is to use the imagery to examine tornado structure and morphology.

TEACHING EXPERIENCE

Fall 2021 Advanced Observations for Lower Atmospheric Research
Instructor

Fall 2019 Meteorological Measurement Systems - Lab
Teaching Assistant (2 sections)

Fall 2018 Undergraduate Orientations to Professional Meteorology
Teaching Assistant

Fall 2017 Undergraduate Dynamics I
Teaching Assistant

PROFESSIONAL SERVICE

2019, 2021 OU Research Experiences for Undergraduates
Mentor

2018 – 2020 OU Student Affairs Committee

- Chairperson (2019-2020)
- Secretary (2018-2019)

2018 – Present Faculty Search Committee
Student representative for the Williams Chair search committee

2017 – Present OU Visiting Student Weekend
Volunteer

2018 – 2019 Four Year Research Engagement (FYRE)
Mentor

2016 – 2017 Student Chapter of the American Meteorological Society & National Weather Association
Web Manager

TECHNICAL SKILLS

Uncrewed Aerial Systems (UAS)
- Licensed under Part 107
- Rotary wing UAS – Proficient
- Fixed wing UAS – Proficient
- VTOL UAS – Proficient

Programming Languages
- Python2 and 3 – Proficient
- MATLAB – Proficient
- Unix – Proficient
- Open Drone Map – Working knowledge
- FORTRAN – Working knowledge
- JAVA – Working knowledge
- C++ – Working knowledge
- HTML/CSS – Working knowledge

Cloud Computing Services
- Amazon Web Services – Proficient
- Google Cloud Services – Proficient

Modeling
- Weather Research and Forecasting (WRF) Model – Working Knowledge

Other Technical Skills
- Git – Proficient
- Photoshop – Proficient
- Illustrator – Proficient
- InDesign – Proficient
- QGIS/ArcGIS – Working knowledge

Peer-Reviewed Publications

In Review

Duncan Jr., J. B., L. Bianco, B. Adler, **T. Bell**, I. V. Djalalova, L. Riihimaki, J. Sedlar, E. N. Smith, D. D. Turner, T. J. Wagner, and J. M. Wilczak, 2021: Evaluating daytime planetary boundary-layer height estimations resolved by both active and passive remote sensing instruments during the CHEESEHEAD19 field campaign. Atmospheric Measurement Techniques Discussions, 1–40, `https://doi.org/10.5194/amt-2021-363`.

Lappin, F. M., **T. M. Bell**, E. A. Pillar-Little, and P. B. Chilson, 2021: Low-level buoyancy as a tool to understand boundary layer transitions. Atmospheric Measurement Techniques Discussions, 1–22, `https://doi.org/10.5194/amt-2021-68`.

Accepted

1. Smith, E. N., B. R. Greene, **T. M. Bell**, W. G. Blumberg, R. Wakefield, D. Reif, Q. Niu, Q. Wang, and D. D. Turner, 2021: Evaluation and Applications of Multi-Instrument Boundary-Layer Thermodynamic Retrievals. Boundary-Layer Meteorol, 181, 95–123, https://doi.org/10.1007/s10546-021-00640-2.
2. Jensen, A. A., J. O. Pinto, S. C. C. Bailey, R. A. Sobash, G. de Boer, A. L. Houston, P. B. Chilson, **T. Bell**, G. Romine, S. W. Smith, D. A. Lawrence, C. Dixon, J. K. Lundquist, J. D. Jacob, J. Elston, S. Waugh, and M. Steiner, 2021: Assimilation of a Coordinated Fleet of Uncrewed Aircraft System Observations in Complex Terrain: EnKF System Design and Preliminary Assessment. Monthly Weather Review, 149, 1459–1480, https://doi.org/10.1175/MWR-D-20-0359.1.
3. Sanchez Gomez, M., J. K. Lundquist, P. M. Klein, and **T. M. Bell**, 2021: Turbulence dissipation rate estimated from lidar observations during the LAPSE-RATE field campaign. Earth System Science Data, 13, 3539–3549, https://doi.org/10.5194/essd-13-3539-2021.
4. Pillar-Little, E. A., B. R. Greene, F. M. Lappin, **T. M. Bell**, A. R. Segales, G. B. H. de Azevedo, W. Doyle, S. T. Kanneganti, D. D. Tripp, and P. B. Chilson, 2021: Observations of the thermodynamic and kinematic state of the atmospheric boundary layer over the San Luis Valley, CO, using the CopterSonde 2 remotely piloted aircraft system in support of the LAPSE-RATE field campaign. Earth System Science Data, 13, 269–280, https://doi.org/10.5194/essd-13-269-2021.
5. **Bell, T. M.**, P. M. Klein, J. K. Lundquist, and S. Waugh, 2020: Remote sensing and radiosonde datasets collected in the San Luis Valley during the LAPSE-RATE campaign. Earth System Science Data Discussions, 1–19, https://doi.org/10.5194/essd-2020-314.
6. Jacobs, A. M., **T. M. Bell**, B. R. Greene, and P. B. Chilson, 2020: The Effect of Climatological Variables on Future UAS-Based Atmospheric Profiling in the Lower Atmosphere. Remote Sensing, 12, 2947, https://doi.org/10.3390/rs12182947.
7. **Bell, T. M.**, B. R. Greene, P. M. Klein, M. Carney, and P. B. Chilson, 2020: Confronting the boundary layer data gap: evaluating new and existing methodologies of probing the lower atmosphere. Atmospheric Measurement Techniques, 13, 3855–3872, https://doi.org/10.5194/amt-13-3855-2020.
8. Segales, A. R., B. R. Greene, **T. M. Bell**, W. Doyle, J. J. Martin, E. A. Pillar-Little, and P. B. Chilson, 2020: The CopterSonde: an insight into the development of a smart unmanned aircraft system for atmospheric boundary layer research. Atmospheric Measurement Techniques, 13, 2833–2848, https://doi.org/10.5194/amt-13-2833-2020.
9. **Bell, T. M.**, P. Klein, N. Wildmann, and R. Menke, 2020: Analysis of flow in complex terrain using multi-Doppler lidar retrievals. Atmospheric Measurement Techniques, 13, 1357–1371, https://doi.org/10.5194/amt-13-1357-2020.
10. Fernando, H., J. Mann, J. Palma, J. Lundquist, R. Barthelmie, M. BeloPereira, W. Brown, F. Chow, T. Gerz, C. Hocut, P. Klein, L. Leo, J. Matos, S. Oncley, S. Pryor, L. Bariteau, **T. M. Bell**, and co-authors: The Perdigão: Peering into Microscale Details of Mountain Winds. *Bull. Amer. Meteor. Soc.*, 100 (5), 799–819. https://doi.org/10.1175/BAMS-D-17-0227.1.
11. Greene, B. R., A. R. Segales, **T. M. Bell**, E. A. Pillar-Little, and P. B. Chilson, 2019: Environmental and sensor integration influences on temperature measurements by rotary-wing unmanned air- craft systems. Sensors, 19 (6), doi:10.3390/s19061470, http://www.mdpi.com/1424-8220/19/6/1470.
12. Chilson, P. B. , **T. M. Bell**, K. A. Brewster, G. Britto Hupsel de Azevedo, F. H. Carr, K. Carson, W. Doyle, C. A. Fiebrich, B. R. Greene, J. L. Grimsley, S. T. Kanneganti11, J. Martin, A. Moore, R. D. Palmer, E. A. Pillar-Little, J. L. Salazar-Cerreno, A. R. Segales, M. E. Weber, M. Yeary, and K. K. Droegemeier: Moving Towards a Network of Autonomous UAS Atmospheric Profiling Stations for Observations in the Earth's Lower Atmosphere: The 3D Mesonet Concept. Sensors, 19 (12), doi:10.3390/s19122720, https://www.mdpi.com/1424-8220/19/12/2720.

Selected Conference Presentations

1. **Bell, T. M.**, P. Klein, E. Smith, J. Gebauer, M. Carney, and D. Turner, 2017. Nocturnal boundary-layer phenomena observed at a complex site during the Perdigão experiment. Complex Terrain Meteorological Studies Relevant to Wind Energy Forecasting I, A23J-08, New Orleans, LA., American Geophysical Union – *Talk*
2. **Bell, T. M.**, P.M. Klein, N. Wildmann, and R. Menke, 2018. General flow spatial variability during the perdigao campaign. Perdigão Data Meeting, Boulder, CO. – *Talk*
3. **Bell, T. M.**, P.M. Klein, N. Wildmann, and R. Menke, 2018. Analysis of flow in complex terrain using innovative multi-doppler lidar retrievals. 23rd Symposium on Boundary Layers and Turbulence, Oklahoma City, OK., Amer. Met. Soc. – *Talk*
4. **Bell, T. M.** and B. R. Greene, 2019. Toys to Tools: Leveraging Drones to Better Understand the Atmosphere. National Tropical Weather Conference, South Padre Island, TX. – *Invited Talk*
5. **Bell, T. M.**, B. R. Greene, P. B. Chilson, P. Klein, M. Carney, D. D. Turner, J. K. Lundquist, P. D. Murphy, C. T. Plunkett, A. R. Segales, G. Britto Huspel de Azevedo, and W. Doyle, 2019. Confronting the Boundary Layer Data Gap: Evaluating New and Existing Methodologies of Probing the Lower Atmosphere. Special Symposium on Meteorological Observations and Instrumentation, 783, Phoenix, AZ., Amer. Met. Soc. – *Poster*
6. **Bell, T. M.**, B. R. Greene, A. R. Segales, P. B. Chilson, P. Klein, M. Carney, D. D. Turner, 2019. Confronting the Boundary Layer Data Gap: Evaluating New and Existing Methodologies of Probing the Lower Atmosphere. Special Symposium on Meteorological Observations and Instrumentation. International Society for Atmospheric Research using Remotely piloted Aircraft, Lugo, Spain. – *Talk*
7. **Bell, T. M.**, A. R. Segales, B. R. Greene, and P. B. Chilson. oward Improving Wind Speed Estimates from an Ascending Rotary-Wing UAS, 2020. 20th Symposium on Meteorological Observations and Instrumentation, 9.5, Boston, MA, Amer. Met. Soc. – *Talk*