

Ariane Middel, Ph.D.

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School of Computing, Informatics, and Decision Systems Engineering (CIDSE)
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Education

Dr.-Ing./Ph.D. Computer Science, University of Kaiserslautern, Germany, 2008

Dissertation: Visualization of Urban Futures

Dipl.-Ing. Geodetic Engineering (equivalent to B.Sc. and M.Sc. in Engineering), University of Bonn, Germany, 2003

Majors: Geographic Information Systems (GIS), Cartography, Photogrammetry

Minors: Urban Planning, Statistics, Physical and Mathematical Geodesy, Surveying

Academic Appointments

2018 – present **Assistant Professor**

School of Arts, Media and Engineering, Arizona State University

School of Computing, Informatics, and Decision Systems Engineering, Arizona State University

Faculty Affiliate

School of Geographical Sciences and Urban Planning, The Design School

Graduate Faculty

School of Sustainability, School of Geographical Sciences and Urban Planning, School of Sustainable Engineering and the Built Environment, Computer Engineering

2017 – 2018 **Assistant Professor**

Geography and Urban Studies Department, Temple University

2015 – 2017 **Assistant Research Professor**

School of Geographical Sciences and Urban Planning, Arizona State University

2013 – 2014 **Research Professional**

Walton Sustainability Solutions Initiative, Arizona State University

2009 – 2013 **Postdoctoral Research Fellow**

Decision Center for a Desert City, Julie Ann Wrigley Global Institute of Sustainability, Arizona State University

2005 – 2008 **Research Assistant**

Department for Computer Graphics and HCI, University of Kaiserslautern, Germany

Research Interests

Urban climate, modeling and simulation, extreme heat, human biometeorology, heat mitigation, human thermal exposure, climate-sensitive urban form and design, sustainable cities, urban climate informatics, climate adaptation and mitigation, geovisualization

Grants and Awards

- 06/2022 – 05/2027 **URoL:EN Rules that govern biodiversity-ecosystem function in changing urban socioecological networks (submitted for review)**
PI (100%), subcontract with Temple University (National Science Foundation), Hamil Pearsall (PI), \$14,931.
- 07/2021 – 06/2022 **2021 FSE Strategic Interest Seed Funding Program: New lab-based and computational methods for simulating extreme hot weather and its impacts on human energy balance and performance (submitted for review)**
Co-PI (33%), ASU internal grant, with Konrad Rykaczewski (PI), Jennifer Vanos, \$25,000.
- 07/2021 – 06/2022 **Healthy Urban Environments Initiative (HUE): Online Decision-Making Tool for Active Shade Management in the Southwest (submitted for review)**
PI (33%), HUE, with Braden Kay, Paul Coseo, Katja Brundiers, \$34,972.21.
- 05/2021 – 04/2024 **Developing and Testing Plans, Policies, and Actions for Cooling Riyadh (submitted for review)**
Co-PI (33%), Kingdom of Saudi Arabia: Royal Commission for Riyadh City (RCRC), with David Sailor (PI), Paul Coseo, \$1,316,456.
- 09/2022 – 08/2027 **NSF Engineering Research Center (ERC) for Urban Thermal Justice (UTJ) (submitted for review)**
Co-PI (11%), subcontract with Georgia Tech (National Science Foundation), with David Sailor (PI), Matei Georgescu, Melissa Guardaro, David Hondula, Kamil Kaloush, Richard King, Edward Vargas, ASU Component \$6,511,449.
- 01/2022 – 12/2025 **SCC-IRG Track 1: Community-driven residential sensing networks (submitted for review)**
Senior Personnel (12%), National Science Foundation, with Zoe Hamstead (University of Buffalo PI), David Hondula (ASU PI), Katja Brundiers, Paul Coseo, Melanie Gall, David Sailor, Jennifer Vanos, Dongwoo Yeom, ASU Component \$854,085.
- 01/2022 – 12/2022 **SCC-PG: Building Heat Resilience in Manufactured and Mobile Home Communities (submitted for review)**
Senior Personnel (8%), National Science Foundation, with David Hondula (PI), Paul Coseo, Melanie Gall, Brian Gerber, Melissa Guardaro, Anastasia Kuznetsov, Patricia Solis, Elisabeth Wentz, \$149,689.
- 08/2021 – 07/2023 **MRI: Acquisition of a High Heat Compatible Sweating Thermal Manikin (submitted for review)**
Co-PI (12%), National Science Foundation, with Konrad Rykaczewski (PI), Jennifer Vanos (Co-PI), David Sailor (Co-PI), Stravos Kavouras (Co-PI), Dongwoo Yeom (Co-PI), \$500,000.
- 01/2021 – 06/2021 **SunBlock**
Co-PI (20%), National Endowment for the Arts (NEA)/City of Phoenix, with David Hondula (PI), Jennifer Vanos, Paul Coseo, and Melissa Guardaro, \$35,001.

- 08/2020 – 06/2021 **City of Phoenix: Cool Pavement Pilot Program**
PI (20%), City of Phoenix, with Jennifer Vanos (Co-PI), Kamil Kaloush, David Sailor, David Hondula, Bill Campbell, Jose Medina, Florian Schneider, \$24,647.
- 07/2020 – 06/2021 **City of Phoenix: Cool Pavement Pilot Program**
PI (20%), City of Phoenix, with Jennifer Vanos (Co-PI), Kamil Kaloush, David Sailor, David Hondula, Bill Campbell, Jose Medina, Florian Schneider, \$99,998.
- 07/2020 – 06/2021 **Developing Urban Cooling Strategies for a Hot Metropolis (ASU internal grant)**
Co-PI (30%), ZIMIN Foundation, with David Sailor (PI), Richard King, \$85,999.
- 07/2020 – 06/2025 **CAREER: Human Thermal Exposure in Cities - Novel Sensing and Modeling to Build Heat-Resilience**
PI (100%), National Science Foundation, \$524,999.
- 07/2020 – 06/2021 **Impact of Sustainable Design on Microclimate and Building Energy Use (ASU internal grant)**
PI (100%), Herberger Research Council and APS Endowment for Sustainable Design Research, \$28,210.
- 06/2020 – 05/2021 **Healthy Urban Environments Initiative (HUE): Zoo Parking Heat and Water Sustainability Project (ASU internal grant)**
Co-PI (33%), HUE, with Ray Quay (PI) and Nancy Grimm (Co-PI), \$50,000.
- 05/2020 – 04/2021 **JST: SCC-PG: Understanding Heat Resiliency via Physiological, Mental, and Behavioral Health Factors for Indoor and Outdoor Urban Environments**
Co-PI (50%), National Science Foundation, with Suren Jayasuriya (PI), Jamie Mullins (Co-PI, University of Massachusetts, Amherst), Tauhidur Rahman (Co-PI, University of Massachusetts, Amherst), \$70,000.
- 04/2020 – 03/2021 **Healthy Urban Environments Initiative (HUE): Heat Maps for Decision-Making in Tempe (ASU internal grant)**
Senior Personnel (20%), with Paul Coseo (PI), David Hondula, Jennifer Vanos, Katja Brundiers, Braden Kay, \$25,000.
- 10/2019 – 10/2020 **AWS: Cloud Credits for ASU Campus Mapping**
PI (100%), Amazon Web Services, \$30,000.
- 10/2019 – 09/2021 **CNH2-L: Toward a Theory of Urban Trees as Living Infrastructure**
Co-PI (30%), National Science Foundation, with George D. Jenerette (UC Riverside PI), Meghan Avolio, Theodore Eisenman, Stephanie S. Pincetl, Mikhail Chester, David Hondula, \$420,000 (ASU component \$60,000)
- 09/2019 – 08/2020 **Arterial Walls and Thermal Comfort in the City of Tempe**
PI (50%), Urban Sustainability Directors Network (USDN), with Paul Coseo (Co-PI), Braden Kay (City of Tempe), \$12,418
- 07/2019 – 01/2020 **Health Impact Project, Tempe**
Co-PI (25%), City of Tempe and PEW Charitable Trust, with Paul Coseo (PI), David Hondula (Co-PI), Jennifer Vanos (Co-PI), \$49,986.

- 07/2019 – 12/2020 **Healthy Urban Environments Initiative (HUE): The Right Shade in the Right Place (ASU internal grant)**
PI (100%), Healthy Urban Environments Initiative, \$49,995.
- 05/2019 – 08/2019 **Urban Climate Research Center Seed Funding to support MaRTy observational field work (ASU internal grant)**
PI (100%), Urban Climate Research Center, \$3,221.
- 05/2019 – 01/2020 **CAP IV Faculty Summer Salary: OpenMRT—Human-scale Modeling of Thermal Urban Environments using Big Data (ASU internal grant)**
PI (100%), National Science Foundation, \$4,833.
- 12/2018 – 11/2022 **Long-Term Ecological Research Program (LTER) CAP IV - Investigating Urban Ecology and Sustainability through the Lens of Urban Ecological Infrastructure**
Senior Personnel (2%), National Science Foundation, with Daniel Childers (PI), Billie L. Turner II, Abigail York, Nancy Grimm, Sharon Hall, Paige Warren, \$4,507,998.
- 11/2017 – 03/2018 **American Forests: Thermal Comfort Assessment**
Co-PI (50%), City of Tempe, with David Hondula (PI), Bonnie Richardson (City of Tempe), \$4,003.00
- 09/2017 – 12/2018 **SCC – Planning Proposal: Too Hot, Too Cold, or Just Right?**
Co-PI (30%), National Science Foundation, with Paul Coseo (PI), David Hondula (Co-PI), \$100,000.
- 07/2017 – 06/2018 **Cool Roofscapes @ the Solar Lab: Thermal Performance of Cool Roof Strategies in Hot Arid Climates (ASU internal grant)**
Co-PI (30%), Herberger Research Council and APS Endowment for Sustainable Design Research, with Paul Coseo (PI) and Jennifer Vanos (Co-PI), \$10,796.00.
- 12/2016 – 11/2018 **Long-Term Ecological Research Program (LTER) CAP IV: Design with Nature**
Senior Personnel (2%), National Science Foundation, with Daniel Childers (PI), Billie L. Turner II, Abigail York, Nancy Grimm, Sharon Hall, Paige Warren, \$2,253,984.00.
- 08/2016 – 07/2020 **CMMI: A Simulation Platform to Enhance Infrastructure and Community Resilience to Extreme Heat Events**
Co-PI (20%), National Science Foundation, with Mikhail Chester (PI), David Hondula, and David Eisenman, \$450,000.
- 08/2016 – 07/2017 **Optimal Deployment of Trees to Mitigate Pedestrian Heat Exposure: Novel Measurements and High-Resolution Modeling**
Co-PI (25%), Roskind Small Grants, with Matei Georgescu (ASU PI), Evyatar Erell (Ben-Gurion University, Israel PI), Scott Krayenhoff, \$10,000.
- 07/2016 – 08/2016 **Impact of Interior Temperatures of Shaded and Unshaded Vehicles on Children’s Health – A Case Study in Phoenix, AZ**
PI (100%), CAP LTER, REU summer 2016, with Jennifer Vanos, \$4,000.

- 04/2016 – 04/2020 **SRN: The Urban Water Innovation Network (U-WIN): Transitioning Toward Sustainable Urban Water Systems**
Senior Personnel, National Science Foundation, with Mazdak Arabi (PI), Matei Georgescu (Co-PI), \$12,000,000 (ASU component \$1,191,572).
- 05/2015 – 06/2016 **City of Tempe - Tree and Shade**
Co-PI (25%), City of Tempe, with Gerald O’Neill (PI), Anne Reichman, Bonnie Richardson, \$28,310.
- 01/2015 – 12/2020 **Microclimate Data Collection, Analysis, and Visualization**
PI (100%), Computer Graphics and HCI Group, University of Kaiserslautern, \$158,101.
- 05/2014 – 08/2016 **Arizona Building Resilience Against Climate Effects (BRACE)**
Senior Personnel, Subcontract to Arizona State University for development of Arizona Climate and Health Profile under auspices of Centers for Disease Control (CDC) Building Resilience Against Climate Effects (BRACE) program, agreement #ADHS15-077418, with Nalini Chhetri (PI), Matthew Roach (Co-PI), David M. Hondula (Co-PI) and Nancy J. Selover (Co-PI), \$125,000.
- 08/2014 – 07/2015 **Informing Emergency and Risk Management Climate Knowledge in Arid Regions**
Co-PI (20%), NOAA OAR-CPO-2013-2003445, with Nalini Chhetri (PI), Kenneth J. Galluppi (Co-PI) and Nancy J. Selover (Co-PI), \$98,443.
- 05/2014 – 06/2016 **Microclimate Impacts of Photovoltaic Canopy Structures**
Co-PI (33%), Arizona State University Lightworks and Strategic Solar Energy, LLC, with Nalini Chhetri (PI) and Nancy J. Selover (Co-PI), \$15,000.
- 08/2012 – 07/2017 **Understanding Impacts of Desert Urbanization on Climate and Surrounding Environments to Foster Sustainable Cities Using Remote Sensing and Numerical Modeling**
Co-PI (20%), NASA ROSES-NNH11ZDA001N, with Soe W. Myint (PI), Ronald Rindfuss (Co-PI), Huei-Ping Huang (Co-PI), Karen Seto (Co-PI), Anthony J. Brazel (Co-PI) and Dan Blumberg (Co-PI), \$928,987.
- 07/2011 – 06/2012 **Impact of Microclimate on Residential Energy Consumption and Water Use**
Co-PI (50%), Decision Center for a Desert City, Julie Ann Wrigley Global Institute of Sustainability, with Subhrajit Guhathakurta (PI), \$49,303.
- 10/2010 – 12/2014 **Urban Form and Energy Use Explored Through Dynamic Networked Infrastructure Model**
Co-PI (33%), National Science Foundation, with Subhrajit Guhathakurta (PI) and Eric Williams (Co-PI), \$350,213.
- 01/2009 – 12/2015 **Visualization of Large and Unstructured Data Sets: Applications in Geospatial Planning, Modeling, and Engineering**
Senior Personnel, German National Science Foundation (DFG) grant #1131, with Hans Hagen (PI), Jan Aurich, Magali Billen, Christoph Garth, Bernd Hamann, Chuck Hansen, Chris Johnson, Kenneth Joy, Louise Kellogg, Mike Kirby, Oliver Kreylos, Ellen Kuhl, Peter Liggesmeyer, Paul Müller, Theo Schmitt, Gerhard Steinebach, Natarajan Sukumar, and Anthony Wexler, €6,800,000 (\$8,356,000).

Publications

Peer-Reviewed Journal Articles

Asterisk (*) indicates lead and/or corresponding authorship. Underscore in author list denotes mentored student.

[J58]* **Ariane Middel**, Saud AlKhaled, Florian Arwed Schneider, Björn Hagen, Paul Coseo. (in press). 50 Grades of Shade. *Bulletin of the American Meteorological Society (BAMS)*. <https://doi.org/10.1175/BAMS-D-20-0193.1> [IF 2019: 9.384]

[J57] Shreya Banerjee, **Ariane Middel**, Subrata Chattopadhyay. (in press). Regression model based three phase approach for assessing outdoor thermal comfort in informal micro-entrepreneurial contexts in tropical Mumbai, *International Journal of Biometeorology*. <https://doi.org/10.1007/s00484-021-02136-7> [IF 2019: 2.680]

[J56] Jennifer K. Vanos, Konrad Rykaczewski, **Ariane Middel**, Daniel J. Vecellio, Robert D. Brown, Terry J. Gillespie. (in press). Improved methods for estimating mean radiant temperature in hot and sunny outdoor settings *International Journal of Biometeorology*. <https://doi.org/10.1007/s00484-021-02131-y> [IF 2019: 2.680]

[J55] Xiandi Zheng, Fanhua Kong, Haiwei Yin, **Ariane Middel**, Hongqing Liu, Ding Wang, Tao Sun, Itamar Lensky. (2021). Outdoor thermal performance of green roofs across multiple time scales: A case study in subtropical China. *Sustainable Cities and Society*, 102909. <https://doi.org/10.1016/j.scs.2021.102909> [IF 2019: 5.268]

[J54] Hongqing Liu, Fanhua Kong, Haiwei Yin, **Ariane Middel**, Xiandi Zheng, Jing Huang, Hairong Xu, Ding Wang, Zhihao Wen. (2021). Impacts of green roofs on water, temperature, and air quality: A bibliometric review, *Building and Environment*, 196:107794 <https://doi.org/10.1016/j.buildenv.2021.107794> [IF 2019: 4.971]

[J53] Scott E. Krayenhoff, Ashley M. Broadbent, Lei Zhao, Matei Georgescu, **Ariane Middel**, James A. Voogt, Alberto Martilli, David Sailor, Evyatar Erell. (2021). Cooling hot cities: A systematic and critical review of the numerical modelling literature, *Environmental Research Letters*. <https://doi.org/10.1088/1748-9326/abdcbf1> [IF 2019: 6.096]

[J52] Mehdi P. Heris, Kenneth J. Bagstad, Charles Rhodes, Austin Troy, **Ariane Middel**, John Matuszak. (2021). Piloting urban ecosystem accounting for the United States, *Ecosystem Services*, 48:101226 <https://doi.org/10.1016/j.ecoser.2020.101226> [IF 2019: 6.330]

[J51] Dorit Aviv, Hongshan Guo, **Ariane Middel**, Forrest Meggers. (2021). Evaluating radiant heat in an outdoor urban environment: Resolving spatial and temporal variations with two sensing platforms and data-driven simulation, *Urban Climate*, 35: 100745. <https://doi.org/10.1016/j.uclim.2020.100745> [IF 2019: 3.834]

[J50] Jennifer K. Vanos, Mary Wright, **Ariane Middel**, Alaina Kaiser, Harrison Ambrose, David M. Hondula. (2020). Perceptions and performance of evaporative misters on outdoor thermal comfort, *International Journal of Biometeorology*. <https://doi.org/10.1007/s00484-020-02056-y> [IF 2019: 2.680]

[J49]* Peter Crank, **Ariane Middel**, Melissa Wagner, Dani Hoots, Martin Smith, Anthony J. Brazel. (2020). Validation of seasonal mean radiant temperature simulations in hot arid urban climate, *Science of the Total Environment*, 141392. <https://doi.org/10.1016/j.scitotenv.2020.141392> [IF 2019: 6.551]

- [J48] Mehdi P. Heris, **Ariane Middel**, Brian H. Muller. (2020). Impacts of form and design policies on urban microclimate: Assessment of zoning and design guideline choices in urban redevelopment projects, *Landscape and Urban Planning*, 202:103870. <https://doi.org/10.1016/j.landurbplan.2020.103870> [IF 2019: 5.441]
- [J47] Zoe Hamstead, Paul Coseo, Saud AlKhaled, Emmanuel Frimpong Boamah, David Hondula, **Ariane Middel**, Nicholas Rajkovich. (2020). Thermally resilient communities: Creating a socio-technical collaborative response to extreme temperatures, *Buildings and Cities*, 1(1):218–232. <http://doi.org/10.5334/bc.15> [IF 2019: N/A]
- [J46]* **Ariane Middel**, V. Kelly Turner, Florian A. Schneider, Yujia Zhang, Matthew Stiller. (2020). Solar reflective pavement – A policy panacea to heat mitigation? *Environmental Research Letters*, 15:064016. <https://doi.org/10.1088/1748-9326/ab87d4> [IF 2019: 6.096]
- [J45] Shreya Banerjee, **Ariane Middel**, Subrata Chattopadhyay. (2020). Outdoor thermal comfort in various microentrepreneurial settings in hot humid tropical Kolkata: Human biometeorological assessment of objective and subjective parameters, *Science of the Total Environment*, 721:137741. <https://doi.org/10.1016/j.scitotenv.2020.137741> [IF 2019: 6.551]
- [J44] David M. Iwaniec, Matei Georgescu, Melissa Davidson, Elisabeth M. Cook, E. Scott Krayenhoff, Nancy B. Grimm, Monica Berbés-Blázquez, Xiaoxiao Li, **Ariane Middel**, David Sampson. (2020). The co-production of sustainable future scenarios, *Landscape and Urban Planning*, 197:103744. <https://doi.org/10.1016/j.landurbplan.2020.103744> [IF 2019: 5.441]
- [J43] Roxana Bujack, **Ariane Middel**. (2020). State of the art in flow visualization in the environmental sciences, *Environmental Earth Sciences*, 79(2):65. <https://doi.org/10.1007/s12665-019-8800-4> [IF 2019: 2.180]
- [J42] Kerry Nice, Jasper S. Wijnands, **Ariane Middel**, Jingcheng Wang, Yiming Qiu, Nan Zhao, Jason Thompson, Gideon D.P.A. Aschwanden, Haifeng Zhao, Mark Stevenson. (2020). Sky pixel detection in outdoor imagery using an adaptive algorithm and machine learning. *Urban Climate*, 31:100572. <https://doi.org/10.1016/j.uclim.2019.100572> [IF 2019: 3.834]
- [J41] Kaylee Colter, **Ariane Middel**, Chris A. Martin. (2019). Effects of natural and artificial shade on human thermal comfort in Phoenix, Arizona, USA, *Urban Forestry and Urban Greening*, 44:126429. <https://doi.org/10.1016/j.ufug.2019.126429> [IF 2018: 3.043]
- [J40] Haiwei Yin, Fanhua Kong, Iryna Dronova, **Ariane Middel**, Philip James. (2019). Investigation of extensive green roof outdoor spatio-temporal thermal performance during summer in a subtropical monsoon climate, *Science of the Total Environment*, 696, 133976. <https://doi.org/10.1016/j.scitotenv.2019.133976> [IF 2018: 5.589]
- [J39] Sushobhan Sen, Jeffery Roesler, Benjamin L. Ruddell, **Ariane Middel**. (2019). Cool pavement strategies for heat mitigation in suburban Phoenix, Arizona, *Sustainability*, 11(16), 4452. <https://doi.org/10.3390/su11164452> [IF 2018: 2.592].
- [J38]* **Ariane Middel**, E. Scott Krayenhoff. (2019). Micrometeorological determinants of pedestrian thermal exposure during record-breaking heat in Tempe, Arizona: Introducing the MaRTy observational platform, *Science of the Total Environment*, 687:137–151. <https://doi.org/10.1016/j.scitotenv.2019.06.085> [IF 2018: 5.589]

[J37] Mehdi Aminipouri, David Rayner, Fredrik Lindberg, Sofia Thorsson, Anders Jensen Knudby, Kirsten Zickfeld, **Ariane Middel**, E. Scott Krayenhoff. (2019). Urban tree planting to maintain outdoor thermal comfort under climate change: The case of Vancouver's local climate zones. *Building and Environment*, 158, 226–236. <https://doi.org/10.1016/j.buildenv.2019.05.022> [IF 2018: 4.820]

[J36] Jason Ching, Dan Aliaga, Gerald Mills, Valery Masson, Linda See, Marina Neophytou, **Ariane Middel**, Alexander Baklanov, Chao Ren, Ed Ng, Jimmy Fung, Michael Wong, Yuan Huang, Alberto Martilli, Oscar Brousse, Iain Stewart, Xiaowei Zhang, Aly Shehata, Shiguang Miao, Xuemei Wang, Weiwen Wang, Yoshiki Yamagata, Denise Duarte, Yuguo Li, Johan Feddema, Benjamin Bechtel, Julia Hidalgo, Yelva Roustan, YoungSeob Kim, Helge Simon, Tim Kropp, Michael Bruse, Fredrik Lindberg, Sue Grimmond, Matthias Demuzere, Fei Chen, Chen Li, Jorge Gonzales-Cruz, Bob Bornstein, Qiaodong He, Tzu-Ping Lin, Adel Hanna, Evyatar Erell, Nigel Tapper, R.K. Mall, Dev Niyogi. (2019). Pathway using WUDAPT's Digital Synthetic City tool towards generating urban canopy parameters for multi-scale urban atmospheric modeling, *Urban Climate*, 28. <https://doi.org/10.1016/j.uclim.2019.100459> [IF 2018: N/A]

[J35] Matthias Demuzere, Benjamin Bechtel, **Ariane Middel**, Gerald Mills. (2019). Mapping Europe into Local Climate Zones, *PLoS ONE*, 14(4): e0214474. <https://doi.org/10.1371/journal.pone.0214474> [IF 2018: 2.776]

[J34] Yujia Zhang, **Ariane Middel**, Billie L. Turner II. (2019). Evaluating the effects of vertical urban forms on neighborhood land surface temperature using Google Street View images. *Landscape Ecology*, 34(3), 681–697. <https://doi.org/10.1007/s10980-019-00794-y> [IF 2018: 4.349]

[J33] Mehdi Aminipouri, Anders Jensen Knudby, E. Scott Krayenhoff, Kirsten Zickfeld, **Ariane Middel**. (2019). Modelling the impact of increased street tree cover on mean radiant temperature across Vancouver's local climate zones. *Urban Forestry and Urban Greening*, 39:9–17. <https://doi.org/10.1016/j.ufug.2019.01.016> [IF 2017: 3.043]

[J32] David Hondula, John Sabo, Ray Quay, Mikhail Chester, Matei Georgescu, Nancy Grimm, Sharon Harlan, **Ariane Middel**, Bruce Rittmann, Benjamin Ruddell, Dave White. (2019). Cities of the Southwest are testbeds for urban resilience, *Frontiers in Ecology and the Environment*. 17(2):79–80. <https://doi.org/10.1002/fee.2005> [IF 2018: 10.935]

[J31]* **Ariane Middel**, Jonas Lukasczyk, Sophie Zakrzewski, Michael Arnold, Ross Maciejewski. (2019). Urban form and composition of street canyons: A human-centric big data and deep learning approach, *Landscape and Urban Planning*, 183:122–132. <https://doi.org/10.1016/j.landurbplan.2018.12.001> [IF 2018: 5.144]

[J30] Jennifer K. Vanos, Eichi Kosaka, Akiko Iida, Makoto Yokohari, **Ariane Middel**, Ian Scott-Flemming, Robert D. Brown. (2019). Planning for spectator thermal comfort and health in the face of extreme heat: The Tokyo 2020 Olympic marathons, *Science of the Total Environment*, <https://doi.org/10.1016/j.scitotenv.2018.11.447> [IF 2018: 5.589]

[J29] Benjamin Bechtel, Paul J Alexander, Christoph Beck, Jürgen Böhner, Oscar Brousse, Jason Ching, Matthias Demuzere, Cidália Fonte, Tamás Gál, Julia Hidalgo, Peter Hoffmann, **Ariane Middel**, Gerald Mills, Chao Ren, Linda See, Panagiotis Sismanidis, Marie-Leen Verdonck, Guang Xu, Yong Xu. (2019). Generating WUDAPT Level 0 data – current status of production and evaluation. *Urban Climate*, 27:24–45. <https://doi.org/10.1016/j.uclim.2018.10.001> [IF 2018: N/A]

- [J28] Christopher Hoehne, David Hondula, Mikhail Chester, David Eisenman, **Ariane Middel**, Andrew Fraser, Lance Watkins, Katrina Gerster. (2018). Heat exposure during outdoor activities in the US varies significantly by city, demography, and activity, *Health and Place*, 54:1–10. <https://doi.org/10.1016/j.healthplace.2018.08.014> [IF 2018: 3.202]
- [J27]* **Ariane Middel**, [Jonas Lukasczyk](#), Ross Maciejewski, Matthias Demuzere, Matthias Roth. (2018). Sky view factor footprints for urban climate modeling, *Urban Climate*, 25:120–134. <https://doi.org/10.1016/j.uclim.2018.05.004> [IF 2017: N/A]
- [J26] Eichi Kosaka, Akiko Iida, Jennifer Vanos, **Ariane Middel**, Makoto Yokohari, Robert Brown. (2018). Microclimate variation and estimated heat stress of runners in the 2020 Tokyo Olympic marathon, *Atmosphere*, 9: 192. <https://doi.org/10.3390/atmos9050192> [IF 2017: 1.704]
- [J25] Jennifer Vanos, **Ariane Middel**, [Michelle Poletti](#), Nancy Selover. (2018). Evaluating the impact of solar radiation on pediatric heat balance within enclosed, hot vehicles. *Temperature*, 1–17. <https://doi.org/10.1080/23328940.2018.1468205> [IF 2017: N/A]
- [J24]* [Chuyuan Wang](#), **Ariane Middel**, Soe W. Myint, Anthony J. Brazel, Shai Kaplan, [Jonas Lukasczyk](#). (2018). Assessing local climate zones in arid cities: The case of Phoenix, Arizona and Las Vegas, Nevada, *ISPRS Journal of Photogrammetry and Remote Sensing*, 141: 59–71. <https://doi.org/10.1016/j.isprsjprs.2018.04.009> [IF 2017: 6.942]
- [J23] David M. Hondula, Robert C. Balling Jr., Riley Andrade, E. Scott Krayenhoff, **Ariane Middel**, Aleš Urban, Matei Georgescu, David J. Sailor. (2017). Biometeorology in cities, *International Journal of Biometeorology*. 61(Supp 1):59–69. <https://doi.org/10.1007/s00484-017-1412-3> [IF 2016: 2.204]
- [J22] Evan R. Kuras, Molly C. Bernhard, Miriam M. Calkins, Kristie L. Ebi, Jeremy J. Hess, Kristina W. Kintziger, Meredith A. Jagger, **Ariane Middel**, Anna A. Scott, June T. Spector, Christopher K. Uejio, Jennifer K. Vanos, Benjamin F. Zaitchik, Julia M. Gohlke, David M. Hondula. (2017). Opportunities and challenges for personal heat exposure research, *Environmental Health Perspectives*, 125(8):085001. <https://doi.org/10.1289/EHP556> [IF 2016: 9.780]
- [J21] Chao Fan, Soe Myint, Shai Kaplan, **Ariane Middel**, Baojuan Zheng, Atiqur Raham, Huei-Ping Huang, Anthony Brazel, Dan Blumberg, (2017). Understanding the Impact of Urbanization on Surface Urban Heat Islands – A Longitudinal Analysis of the Oasis Effect in Subtropical Desert Cities, *Remote Sensing*, 9(7), 672. <https://doi.org/10.3390/rs9070672> [IF 2016: 3.244]
- [J20] Benjamin Bechtel, Matthias Demuzere, Panagiotis Sismanidis, Daniel Fenner, Oscar Brousse, Christoph Beck, Frieke Van Coillie, Olaf Conrad, Iphigenia Keramitsoglou, **Ariane Middel**, Gerald Mills, Dev Niyogi, Marco Otto, Linda See, Marie-Leen Verdonck, (2017). Quality of crowdsourced data on urban morphology – the human influence experiment (HUMINEX), *Urban Science*, 1(2):15. <https://doi.org/10.3390/urbansci1020015> [IF 2016: N/A]
- [J19]* **Ariane Middel**, [Jonas Lukasczyk](#), Ross Maciejewski. (2017). Sky View Factors from Synthetic Fisheye Photos for Thermal Comfort Routing – A Case Study in Phoenix, Arizona, *Urban Planning*, 2(1):19–30. <http://dx.doi.org/10.17645/up.v2i1.855> [IF 2016: N/A]
- [J18] Haiwei Yin, Fanhua Kong, **Ariane Middel**, Iryna Dronova, Hailong Xu, Philip James. (2017). Cooling effect of direct green façades during hot summer days: An observational study in Nanjing, China using TIR and 3DPC data, *Building and Environment*, 116:195–206. <https://doi.org/10.1016/j.buildenv.2017.02.020> [IF 2016: 4.053]

- [J17]* **Ariane Middel**, Nancy Selover, Björn Hagen, Nalini Chhetri. (2016). Impact of Shade on Outdoor Thermal Comfort - A Seasonal Field Study in Tempe, Arizona, *International Journal of Biometeorology*, 60(12):1849–1861. <https://doi.org/10.1007/s00484-016-1172-5> [IF 2016: 2.204]
- [J16] Katherine Crewe, Anthony J. Brazel, **Ariane Middel**. (2016). Desert New Urbanism: Testing for Comfort in Downtown Tempe Arizona, *Journal of Urban Design*, 21(6):746–763. <https://doi.org/10.1080/13574809.2016.1187558> [IF 2015: 0.605]
- [J15] Björn Hagen, **Ariane Middel**, David Pijawka. (2016). Global Climate Change Risk and Mitigation Perceptions: A comparison of nine countries, *Journal of Sustainable Development*, 9(5):214–228. <https://doi.org/10.5539/jsd.v9n5p214> [IF 2016: /A]
- [J14] Fanhua Kong, Changfeng Sun; Fengfeng Liu; Haiwei Yin, Fei Jiang, Yingxia Pu, Gina Cavan, Cynthia Skelhorn, **Ariane Middel**, Iryna Dronova. (2016). Energy Saving Potential of Fragmented Green Spaces Due to their Temperature Regulating Ecosystem Services in the Summer, *Applied Energy*, 183:1428–1440. <https://doi.org/10.1016/j.apenergy.2016.09.070> [IF 2016: 7.182]
- [J13] Björn Hagen, David Pijawka, **Ariane Middel**. (2016). European Climate Change Perceptions: Mitigation and Adaptation Policies to Improve Resiliency, *Environmental Policy and Governance*, 26:170–183. <https://doi.org/10.1002/eet.1701> [IF 2016: 2.032]
- [J12] Xiaoxiao Li, Wenwen Li, **Ariane Middel**, Sharon Harlan, Anthony J. Brazel, Billie L. Turner II. (2016). Remote Sensing of the Surface Urban Heat Island and Land Architecture in Phoenix, Arizona: Combined Effects of Land Composition and Configuration and Cadastral-Demographic-Economic Factors, *Remote Sensing of Environment*, 174:233–243. <https://doi.org/10.1016/j.rse.2015.12.022> [IF 2016: 6.265]
- [J11] Jennifer K. Vanos, **Ariane Middel**, Grant R. McKercher, Evan R. Kuras, Benjamin L. Ruddell. (2016). Hot playgrounds and children's health: A multiscale analysis of surface temperatures in Arizona, USA. *Landscape and Urban Planning*, 146:29–42. <https://doi.org/10.1016/j.landurbplan.2015.10.007> [IF 2016: 4.563]
- [J10] **Kathrin Hüb**, Benjamin L. Ruddell, **Ariane Middel**. (2015). Sensor lag correction for mobile urban microclimate measurements, *Urban Climate*, 14(4):622–635. <https://doi.org/10.1016/j.uclim.2015.10.003> [IF 2015: N/A]
- [J9] Soe W. Myint, Baojuan Zheng, Emily Talen, Chao Fan, Shai Kaplan, **Ariane Middel**, Martin Smith, Huei-Ping Huang, Anthony J. Brazel. (2015). Does the spatial arrangement of urban landscape matter? Examples of urban warming and cooling in Phoenix and Las Vegas, *Ecosystem Health and Sustainability*, 1(4), art15. <https://doi.org/10.1890/EHS14-0028.1> [IF 2015: N/A]
- [J8] **Kathrin Hüb**, **Ariane Middel**, Benjamin L. Ruddell, Hans Hagen. (2015). TraVis – A Visualization Framework for Mobile Transect Data Sets in an Urban Microclimate Context, *Proceedings of the Pacific Visualization Symposium (PacificVis)*, 2015 IEEE, Hangzhou, China, April 14-17, 2015. [Acceptance Rate: 30.4%]
- [J7]* **Ariane Middel**, Nalini Chhetri, Ray Quay. (2015). Urban Forestry and Cool Roofs: Assessment of Heat Mitigation Strategies in Phoenix Residential Neighborhoods, *Urban Forestry and Urban Greening*, 14(1):178–186. <https://doi.org/10.1016/j.ufug.2014.09.010> [IF 2014: 2.109]

[J6] Kathrin Hüb, Nils H. Feige, Lars S. Hüttenberger, **Ariane Middel**, Hans Hagen. (2014). Visualizing the Temporal Development of Thermo-Radiative Features on Ground-Based Thermographs, *Environmental Earth Sciences*, 72(10):3781–3793. <https://doi.org/10.1007/s12665-014-3472-6> [IF 2016: 1.765]

[J5]* **Ariane Middel**, Kathrin Hüb, Anthony J. Brazel, Chris Martin, Subhrajit Guhathakurta. (2014). Impact of Urban Form and Design on Mid-Afternoon Microclimate in Phoenix Local Climate Zones, *Landscape and Urban Planning*, 122:16–28. <https://doi.org/10.1016/j.landurbplan.2013.11.004> [IF 2016: 4.563]

[J4]* **Ariane Middel**, Anthony J. Brazel, Patricia Gober, Soe W. Myint, Heejun Chang, Jiunn-Der Duh. (2012) Land Cover, Climate, and the Summer Surface Energy Balance in Phoenix, AZ and Portland, OR, *International Journal of Climatology*, 32(13):2020–2032. <https://doi.org/10.1002/joc.2408> [IF 2015: 3.609]

[J3] Patricia Gober, **Ariane Middel**, Anthony J. Brazel, Soe W. Myint, Heejun Chang, Jiunn-Der Duh, Lily House-Peters. (2012). Tradeoffs Between Water Conservation and Temperature Amelioration in Phoenix and Portland: Implications for Urban Sustainability, *Urban Geography*, 33(7):1030–1054. <https://doi.org/10.2747/0272-3638.33.7.1030> [IF 2015: 1.322]

[J2]* **Ariane Middel**, Anthony J. Brazel, Shai Kaplan, Soe W. Myint. (2012). Daytime Cooling Efficiency and Diurnal Energy Balance in Phoenix, AZ, *Climate Research*, 54(1):21–34. <https://doi.org/10.3354/cr01103> [IF 2015: 2.496]

[J1]* **Ariane Middel**, Anthony J. Brazel, Björn Hagen, Soe W. Myint. (2011). Land Cover Modification Scenarios and their Effects on Daytime Heating in the Inner Core Residential Neighborhoods of Phoenix, AZ, USA, *Journal of Urban Technology*, 18(4):61–79. <https://doi.org/10.1080/10630732.2011.648434> [IF 2015: 1.234]

Journal Articles under Review

[JR1] Yue Chang, Jingfeng Xiao, Xuxiang Li, **Ariane Middel**, Yunwei Zhang, Zhaolin Gu, Yiping Wu, Shan He, in revision, Exploring diurnal cycling of urban thermal environment and variations among local climate zones with land surface temperature data derived from ECOSTRESS. *Remote Sensing of Environment*. [IF 2019: 9.085]

Journal Articles in Preparation

[JP4] V. Kelly Turner, Morgan Rogers, **Ariane Middel**, Florian A. Schneider, Yujia Zhang, Jon Ocon, Megs Seeley, Matthew Stiller, Hyper local land systems: Synergies and trade-offs between regional heat island mitigation and pedestrian thermal comfort, *Journal of Land Use Science* [IF 2019: 2.210]

[JP3] Dustin L. Herrmann, Meghan L. Avolio, Mikhail V. Chester, Theodore S. Eisenman, David M. Hondula, **Ariane Middel**, Diane E. Pataki, Stephanie Pincetl, Lara A. Roman, G. Darrel Jenerette, Realizing urban trees as living infrastructure to address climate change, *BioScience* [IF 2019: 8.282].

[JP2]* **Ariane Middel**, Benjamin Bechtel, Negin Nazarian, Matthias Demuzere, Urban Climate Informatics, *Frontiers*.

[JP1] Negin Nazarian, Paolini Riccardo, E. Scott Krayenhoff, Winston Chow, **Ariane Middell**, Jennifer Vanos, Jason Lee, Ollie Jay, Stefano Schiavon, Richard de Dear, David Hondula, Alberto Martilli, Leslie Norford, Benjamin Bechtel, Mat Santamouris, Toby Cheung, Mahsan Sadeghi, Current Research and Future Directions for Assessing the Impact of Urban Overheating on Human Life, *Environmental Science and Technology*. [IF 2019: 7.864]

Refereed Conference Proceedings

[P14] Yuliya Dzyuban, David Hondula, Charles Redman, **Ariane Middell**, 2018, Analyzing transit-based heat exposure and behaviors to enhance urban climate adaptation and mitigation strategies in the southwest USA, IFoU 2018: Reframing Urban Resilience Implementation: Aligning Sustainability and Resilience, Barcelona, Spain, December 10-12, 2018.

[P13] Roxana Bujack, **Ariane Middell**, Strategic Initiatives for Flow Visualization in Environmental Sciences, *Proceedings of the Workshop on Visualization in Environmental Sciences (EnvirVis)*, Groningen, Netherlands, June 6-7, 2016.

[P12] Kathrin Hüb, **Ariane Middell**, Benjamin L. Ruddell, Hans Hagen, A Data-Driven Approach to Categorize Climatic Microenvironments, *Proceedings of the Workshop on Visualization in Environmental Sciences (EnvirVis)*, Groningen, Netherlands, June 6-7, 2016.

[P11] Kathrin Hüb, **Ariane Middell**, Benjamin L. Ruddell, Hans Hagen, Spatial Aggregation of Mobile Transect Measurements for the Identification of Climatic Microenvironments, *Proceedings of the Workshop on Visualization in Environmental Sciences (EnvirVis)*, Cagliari, Italy, May 25-26, 2015.

[P10] Jonas Lukasczyk, Xing Liang, Wei Luo, Eric Ragan, **Ariane Middell**, Nadya Bliss, Dave White, Hans Hagen, Ross Maciejewski, A Collaborative Web-Based Environmental Data Visualization and Analysis Framework, *Proceedings of the Workshop on Visualization in Environmental Sciences (EnvirVis)*, Cagliari, Italy, May 25-26, 2015.

[P9] Jonas Lukasczyk, **Ariane Middell**, Hans Hagen, WebGL-Based Geodata Visualization for Policy Support and Decision Making, *Proceedings of the Workshop on Visualization in Environmental Sciences (EnvirVis)*, Swansea, Wales, UK, June 9-13, 2014.

[P8] Kathrin Hüb, **Ariane Middell**, Hans Hagen, Using K-Means Clustering for a Spatial Analysis of Multivariate and Time-Varying Microclimate Data, *Proceedings of the Workshop on Visualization in Environmental Sciences (EnvirVis)*, Leipzig, Germany, June 17-18, 2013.

[P7] **Ariane Middell**, Kathrin Hüb, Anthony J. Brazel, Chris Martin, Subhrajit Guhathakurta, Urban Form, Landscape Design, and Microclimate in Phoenix, Arizona, *Proceedings of the 8th International Conference on Urban Climate (ICUC8)*, Dublin, Ireland, August 6-10, 2012.

[P6] Sebastian Thelen, Jörg Meyer, **Ariane Middell**, Peter-Scott Olech, Achim Ebert, Hans Hagen, Tag-Based Interaction with Large High-Resolution Displays, *Proceedings of the 4th IASTED International Conference on Human-Computer Interaction (IASTED-HCI)*, St. Thomas, Virgin Islands, USVI, November 22-24, 2009.

[P5] **Ariane Middell**, Björn Hagen, Anthony J. Brazel, Soe Myint, Simulation of Possible Scenarios for Local Scale Energy Balances in Residential Neighborhoods in Phoenix, AZ, USA, *Proceedings of the 8th International Symposium (UPE 8) of the International Urban Planning and Environment Association*, Kaiserslautern, Germany, March 23-26, 2009.

[P4] Peter-Scott Olech, **Ariane Middel**, Max Langbein, Sebastian Thelen, Achim Ebert, Jörg Meyer, Hans Hagen, Enhancing the Planner's Toolkit – New Display Technologies for Planning Support, *Proceedings of the 8th International Symposium (UPE 8) of the International Urban Planning and Environment Association*, Kaiserslautern, Germany, March 23-26, 2009.

[C3] Peter-Scott Olech, Sebastian Thelen, **Ariane Middel**, Achim Ebert, Jörg Meyer, Hans Hagen, Digital Representation of Environment Data Using Advanced Display Technologies, *ISDE6 - The 6th International Symposium on Digital Earth*, Beijing, China, 2009.

[P2] **Ariane Middel**, Peter-Scott Olech, Björn Hagen, Re-Tooling Urban Planners - Google Earth as a Planning Support Tool, *Proceedings of the 11th International Conference on Computers in Urban Planning and Urban Management (CUPUM 2009)*, Hong Kong, 2009.

[P1] Thomas H. Kolbe, **Ariane Middel**, Lutz Plümer, 3D-Kartographie für die Fußgängernavigation: Virtuelle Wegweiser in Panoramen, Tagungsband zur 40. Sitzung der Arbeitsgemeinschaft 'Automation in der Kartographie' AgA 2003 in Erfurt, *Mitteilungen des Bundesamtes für Kartographie und Geodäsie, BKG*, Heft 31, Frankfurt, 2004.

Book Chapters

[B8] Darren M. Ruddell, Anthony J. Brazel, Winston Chow, **Ariane Middel**, Björn Hagen, David Pijawka (ed.), *Sustainability in the 21st Century, 3rd Edition*, Kendall Hunt Publishing, 2020.

[B7] Björn Hagen, **Ariane Middel**, What Do Sustainable Cities Look Like?, Björn Hagen, David Pijawka (ed.), *Sustainability in the 21st Century, 3rd Edition*, Kendall Hunt Publishing, 2020.

[B8] Darren M. Ruddell, Anthony J. Brazel, Winston Chow, **Ariane Middel**, Björn Hagen, David Pijawka (ed.), *Sustainability in the 21st Century, 2nd Edition* Kendall Hunt Publishing, 2017.

[B7] Björn Hagen, **Ariane Middel**, What Do Sustainable Cities Look Like?, Björn Hagen, David Pijawka (ed.), *Sustainability in the 21st Century, 2nd Edition* Kendall Hunt Publishing, 2017.

[B6] Darren M. Ruddell, Anthony J. Brazel, Winston Chow, **Ariane Middel**, David Pijawka (ed.), *Sustainability in the 21st Century*, Kendall Hunt Publishing, 2015.

[B5] Björn Hagen, **Ariane Middel**, What Do Sustainable Cities Look Like?, David Pijawka (ed.), *Sustainability in the 21st Century*, Kendall Hunt Publishing, 2015.

[B4] **Ariane Middel**, Subhrajit Guhathakurta, Hans Hagen, Peter-Scott Olech, Florian Höpel, Visualizing Future 3-Dimensional Neighborhoods in Phoenix: An Application Incorporating Empirical Methods with Computational Graphics, M. Batty and H. Lin (eds.), *Virtual Geographic Environments*, Science Press, 2009, ISBN 978-7-03-023467-4.

[B3] **Ariane Middel**, Estimating Residential Building Types from Demographic Information at a Neighborhood Scale, Gerhard Steinebach (ed.), *Visualizing Sustainable Planning*, p.187-202, Springer, 2009, ISBN 978-3-540-88202-2.

[B2] **Ariane Middel**, A Framework for Visualizing Multivariate Geodata, Hans Hagen, Martin Hering-Bertram, Christoph Garth (eds.) *Visualization of Large and Unstructured Data Sets*, p. 13-21,

Kaiserslautern, 2007, *GI-Edition*, Lecture Notes in Informatics (LNI), Seminars Vol. S-7, ISBN 978-3-88579-441-7.

[B1] **Ariane Middel**, Procedural 3D Modeling of Cityscapes, Hans Hagen, Andreas Kerren, Peter Dannenmann (eds.), *Visualization of Large and Unstructured Data Sets*, pp. 133-142, Kaiserslautern, 2006, *GI-Edition*, Lecture Notes in Informatics (LNI), Seminars Vol. S-4, ISBN 978-3-88579-438-7.

Edited Books

[E2] Christoph Garth, **Ariane Middel**, Hans Hagen (eds.), *Visualization of Large and Unstructured Data Sets - Applications in Geospatial Planning, Modeling and Engineering (IRTG 1131 Workshop 2011)*, OASICS Vol. 27, June 10-11, 2011, ISBN 978-3-939897-46-0.

[E1] **Ariane Middel**, Inga Scheler, Hans Hagen (eds.), *Visualization of Large and Unstructured Data Sets - Applications in Geospatial Planning, Modeling and Engineering (IRTG 1131 Workshop 2010)*, OASICS Vol. 19, March 19-21, 2010, ISBN 978-3-939897-29-3.

Reports and Non-Refereed Publications

[R9] Leena Järvi, **Ariane Middel**, Helen Ward, 2018, Special Report: ICUC-10 event on Equality and Diversity in Urban Climate. *Urban Climate News*, Issue No. 70, December 2018.

[R8] David M. Hondula, **Ariane Middel**, Jennifer K. Vanos, Lexie Herdt, Alanna Kaiser, 2017, Urban Water Infrastructure for Cooling: Case Studies from Humid and Arid Cities, *Regions Magazine*, 306(1):20–23. DOI: 10.1080/13673882.2017.11878969

[R7] Scott E. Krayenhoff, Ashley Broadbent, Matei Georgescu, Evyatar Erell, Alberto Martilli, **Ariane Middel**, David Sailor, 2017, Urban cooling from heat mitigation strategies: Systematic review of the numerical modeling literature. *Urban Climate News*, Issue 64, International Association for Urban Climate, p. 22-25.

[R6] Alex Slaymaker, Bonnie Richardson, **Ariane Middel**, Braden Kay, Andrea Levy, Suzanne Jumper, Abby Johnson, City of Tempe Urban Forest Master Plan, 2016.

[R5] Wen-Ching Chuang, Alex Karner, Nancy Selover, David Hondula, Nalini Chhetri, **Ariane Middel**, Matthew C. Roach, Brigitte Dufour, Arizona Extreme Weather, Climate and Health Synthesis Report. A report prepared for Arizona Department of Health Services and the United States Centers for Disease Control and Prevention Climate-Ready States and Cities Initiative, 2015.

[R4] Nancy Selover, **Ariane Middel**, Nalini Chhetri, Ben Mackowski, C.J. Sisodiya, Impact of Solar Parasol Shading on Automobile Temperatures, Summary report of preliminary findings, Arizona State University, June 2015.

[R3] **Ariane Middel**, Kathrin Häb, 2015, Heat mitigation through urban form and design – A case study of Phoenix, AZ, *Urban Climate News*, Issue 55, International Association for Urban Climate, p. 13-18.

[R2] **Ariane Middel**, Nalini Chhetri, 2014, City of Phoenix Cool Urban Spaces Project—Urban Forestry and Cool Roofs: Assessment of Heat Mitigation Strategies in Phoenix. Center for Integrated Solutions to Climate Challenges, Arizona State University.

[R1] **Ariane Middel**, Ray Quay, Dave White, 2013, Water Reuse in Central Arizona. DCDC Technical Report 13-01, Tempe, AZ, Arizona State University.

Data Sets

[D1] Mary K. Wright, Peter Crank, **Ariane Middel**, David Hondula, David Sailor, 2021, Fine-scale meteorological observations from walking traverses in two Phoenix Area Social Survey (PASS) 2017 neighborhoods (2019) ver 1. Environmental Data Initiative.
<https://doi.org/10.6073/pasta/e189ff52024a464dabb31861f397de3a> (Accessed 2021-02-10).

Conference Presentations and Posters

[C121] V. Kelly Turner, Morgan Rogers, **Ariane Middel**, Florian A. Schneider, Yujia Zhang, Jonathan P. Ocón, Megs Seeley, Matthew Stiller, Hyper local land systems: Synergies and trade-offs between regional heat island mitigation and pedestrian thermal comfort, *3rd World Conference of the Society for Urban Ecology (SURE) 2021*, Poznań, Poland, July 7–9, 2021.

[C120] Tim Aiello, Scott Krayenhoff, Ariane Middel, Jon Warland A seasonal assessment of urban outdoor thermal exposure in a humid continental climate using the MaRTy observational platform, *vEGU General Assembly 2021*, April 19–30, 2021.

[C119] Valéry Masson, Estelle de Coning, Alexander Baklanov, Jorge Amorim, Clotilde Augros, Stéphane Bélair, Andreas Christen, Gilles Foret, Charmaine Franklin, Jorge Gonzalez-Cruz, Sue Grimmond, Martial Haeffelin, Simone Kotthaus, Humphrey Lean, Aude Lemonsu, Sylvie Leroyer, Peter Li, **Ariane Middel**, Amandine Rosso, and Scott Swerdlin, WMO Research Demonstration Project “Paris 2024 Olympic Games”: An international initiative towards 100m-resolution meteorological and air quality forecasting in urban areas, *vEGU General Assembly 2021*, April 19–30, 2021.

[C118] **Ariane Middel**, Human-Scale Measurements and Modeling of Heat Exposure, *18th Annual Climate Prediction Applications Science Workshop*, Phoenix, Arizona, April 20–22, 2021.

[C117] Morgan Rogers, V. Kelly Turner, **Ariane Middel**, Jon Ocon, Matthew Stiller, Evaluating micro-scale cooling interventions, *AAG Annual Meeting 2021*, virtual, April 7–11, 2021.

[C116] **Ariane Middel**, Solar reflective pavements—A policy panacea to heat mitigation, Climate Specialty Group John Russell Mather Paper of the Year Presentation, *AAG Annual Meeting 2021*, virtual, April 7–11, 2021.

[C115] Paul Coseo, Braden Kay, Katja Bundiers, **Ariane Middel**, Jennifer Vanos, David Hondula, Grace Logan, Heat & Health Maps for Decision-Making: Climate Action for Resilience to Extreme Heat in Tempe, Arizona, *CELA 100 + 1 Resilience Conference*, March 17-20, 2021.

[C116] Peter J. Crank, Mary K. Wright, Ariane Middel, David Hondula, David J. Sailor, Responding to Shade: Connecting Ecological and Social Landscapes to the Thermal Environments of Neighborhoods in Phoenix, Arizona, *101st AMS Annual Meeting*, Virtual, January 10–15, 2021.

[C115] Dustin L. Herrmann, David M. Hondula, Meghan L. Avolio, Mikhail V. Chester, Stephanie S. Pincetl, Theodore S. Eisenman, **Ariane Middel**, Diane E. Pataki, Sharon L. Harlan, and G. Darrel Jenerette, “Right tree, right place, right purpose”: Linking Governance and Biotechnical Capacities in Addressing Climate Change through Urban Trees. *2020 AGU Fall Meeting*, December 7–11, 2020.

- [C114] Matthew Huff, **Ariane Middel**, OpenMRT Model Development and Validation using Thermal Images, *Annual UCRC Poster Symposium*, Tempe, AZ, October 15, 2020.
- [C113] Florian A. Schneider, Johny Cordova, **Ariane Middel**, COPE Phoenix – COol Pavement Evaluation Phoenix, *Annual UCRC Poster Symposium*, Tempe, AZ, October 15, 2020.
- [C112] Ananth Udupa, Florian Schneider, **Ariane Middel**, Thermal Panoramas for Urban Climate Applications, *Annual UCRC Poster Symposium*, Tempe, AZ, October 15, 2020.
- [C111] Marc A. Adams, A.D. Patel, H. Hook, T-Y Yu, **Ariane Middel**, Ross Maciejewski, V. Berardi, Christine B. Phillips, Deep Learning and Google Street View: Automating Microscale Audits of Street Intersection Features for Physical Activity. 2020 *Annals of Behavioral Medicine*, 54, S99.
- [C110] Yuliya Dzyuban, David Hondula, **Ariane Middel**, Exploring pedestrian thermal comfort in hot climates, *EGU General Assembly 2020*, Vienna, Austria, May 3–8, 2020.
- [C109] Shreya Banerjee, **Ariane Middel**, Subrata Chattopadhyay, Bio-meteorological assessment of outdoor micro-entrepreneurial informal communities in extreme heat- A case of two tropical Indian megacities, *EGU General Assembly 2020*, Vienna, Austria, May 3–8, 2020.
- [C108] Mehdi Heris, Kenneth Bagstad, Austin Troy, **Ariane Middel**, National Urban Ecosystem Accounting: A Pilot Study of Heat Mitigation and Rainfall Interception Benefits of Urban Trees, *AAG Annual Meeting*, Denver, Colorado, April 6–10, 2020.
- [C107] **Ariane Middel**, Florian A. Schneider, Saud AlKhaled, Paul Coseo, Björn Hagen, The Right Shade in the Right Place: Thermal Assessment of Natural and Engineered Shade in Tempe, AZ, *EDRA51*, Tempe, AZ, April 4–7, 2020.
- [C106] Saud AlKhaled, **Ariane Middel**, Paul Coseo, Cooling Potentials of Rooftop Shade: Potentials of an Effective Promising Retrofitting Strategy for Reducing Urban Induced Heating in Kuwait’s Residential Neighborhoods, *EDRA51*, Tempe, AZ, April 4–7, 2020.
- [C105] Paul Coseo, Braden Kay, **Ariane Middel**, Jennifer Vanos, David Hondula, Zoe Hamstead, Emmanuel Frimpong Boamah, Nicholas Rajkovich, Saud AlKhaled, City-University Partnerships for Thermally-Resilient Communities, *EDRA51*, Tempe, AZ, April 4–7, 2020.
- [C104] Ananth Udupa, **Ariane Middel**, Pedestrian Thermal Exposure in Urban Parks in Tempe, AZ, Poster presented at the *AAAS Annual Meeting*, Seattle, Washington, February 13–16, 2020.
- [C103] Mark Adams, Akshar Patel, Hannah Hook, **Ariane Middel**, Ross Maciejewski, Vincent Berardi, Christine Phillips, Training Computers to See the Built Environment: Automated Detection of Intersection Features using Computer Vision and Google Street View Images, *Active Living Conference 2020*, Orlando, Florida, February 2–5, 2020.
- [C105] Stephen R. Elser, Nancy B. Grimm, **Ariane Middel**, Growing Shade: Daytime Cooling Ecosystem Services of Common Street Trees in Phoenix. Poster presented January 17, 2020 at the *22nd Annual CAP LTER Poster Symposium*, Tempe, Arizona, 2020.
- [C104] Mary K. Wright, Peter J. Crank, **Ariane Middel**, David M. Hondula, David J. Sailor, A Comprehensive Assessment of the Thermal Environment of Two PASS Neighborhoods. Poster presented January 17, 2020 at the *22nd Annual CAP LTER Poster Symposium*, Tempe, Arizona, 2020.

[C103] Lara Lebeiko, Paul Coseo, **Ariane Middel**, Jennifer Vanos, David Hondula, Braden Kay, Florian A. Schneider, Saud AlKhaled, Ananth Udupa, Jianni Labato, Liza Kurtz, Abdullah Aldakheelallah, Adapting Urban Infrastructure for Local and Global Climate Change: Climate Action Planning for Extreme Heat in Urban Environments. Poster presented January 17, 2020 at the *22nd Annual CAP LTER Poster Symposium*, Tempe, Arizona, 2020.

[C102] **Ariane Middel**, V. Kelly Turner, Florian A. Schneider, Yujia Zhang, Matthew Stiller, Thermal Performance of Cool Pavements in Los Angeles Residential Neighborhoods: A Pedestrian Perspective, *100th AMS Annual Meeting*, Boston, Massachusetts, January 12–16, 2020.

[C101] V. Kelly Turner, **Ariane Middel**, Florian A. Schneider, Yujia Zhang, Matthew Stiller, Transformative Climate Communities: Informing Adaptation Planning through Cool Urban Design Interventions in Southern California, *100th AMS Annual Meeting*, Boston, Massachusetts, January 12–16, 2020.

[C100] Jason Ching, Dan Aliaga, Gerald Mills, Alberto Martilli, Jimmy Fung, Benjamin Bechtel, Matthias Demuzere, **Ariane Middel**, Marina Neophytou, Chao Ren, Johan Feddema, Valery Masson, N. Buckley, C. Reinhart, Linda See, Yuan Huang, Fei Chen, Nigel Tapper, Alexander Baklanov, Ed Ng, Yoshiki Yamagata, Kevin Lau, Michael F. Wong, Fredrik Lindberg, Xuemei Wang, Weiwen Wang, M. F. Andrade, Oscar Brousse, Helge Simon, Tim Kropp, Shiguang Miao, Qiaodong He, Denise Duarte, P. Mouzourides, Julia Hidalgo, Yelva Roustan, YoungSeob Kim, L.S. Ferreira, L. Zhao, N. Zhang, Bob Bornstein, Jorge Gonzales-Cruz, Dev Niyogi, The WUDAPT approach towards supporting multi-scale fit for purpose intra-urban atmospheric modeling and analyses applications, *100th AMS Annual Meeting*, Boston, Massachusetts, January 12–16, 2020.

[C99] Yuliya Dzyuban, David Hondula, Maggie Messerschmidt, Jennifer Vanos, **Ariane Middel**, Paul Coseo, Heat Walk: Perception of Thermal Comfort in Relation to Street Infrastructure, *100th AMS Annual Meeting*, Boston, Massachusetts, January 12–16, 2020.

[C98] Jacob Lachapelle, Nicole Menheere, Scott Krayenhoff, **Ariane Middel**, Ashley Broadbent, TUF-Pedestrian: A Three-Dimensional Microscale Model for Pedestrian Thermal Exposure in Urban Environments, *100th AMS Annual Meeting*, Boston, Massachusetts, January 12–16, 2020.

[C97] Paul Coseo, Braden Kay, **Ariane Middel**, Jennifer Vanos, David Hondula, Zoe Hamstead, Nicholas Rajkovich, City-University Partnerships to Reduce Thermal Vulnerability: a living labs approach for more thermally-comfortable and equitable communities. *2019 AGU Fall Meeting*, San Francisco, December 9–13, 2019.

[C96] Jacob Lachapelle, Nicole Menheere, Scott Krayenhoff, **Ariane Middel**, Ashley Broadbent, TUF-Pedestrian: A Three-Dimensional Microscale Model for Pedestrian Thermal Exposure in Urban Environments, CAGONT 2019, Department of Geography, Environment and Geomatics, University of Guelph on October 25-26.

[C95] **Ariane Middel**, Matthias Demuzere, Urban Climate Informatics – An Emerging Research Field, *8th Belgian Geographers Day*, Ghent, October 18, 2019.

[C94] Jennifer Vanos, David Hondula, **Ariane Middel**, H. Ambrose, Alanna Kaiser, Mary Wright, Motivations to use water for thermal comfort: the influence of evaporative mister systems on thermal comfort in outdoor eateries. *1st European Biometeorologists' Regional Meeting*, Warsaw, Poland, May 22-24, 2019.

- [C93] Peter Crank, Melissa Wagner, **Ariane Middel**, Dani Hoots, Martin Smith, Anthony J. Brazel, An Evaluation of Mean Radiant Temperature Estimations in an Arid Urban Climate, Poster presented April 24 at the *Annual ISSR Poster Symposium*, Tempe, Arizona, 2019.
- [C92] Yujia Zhang, **Ariane Middel**, Billie L. Turner II, Evaluating the effect of 3D urban form on land surface temperature using Google Street View and geographically weighted regression, *Global Land Program, 4th Open Science Meeting 2019*, Bern, Switzerland, April 24–26, 2019.
- [C91] **Ariane Middel**, Urban Climate Informatics – an emerging research field. *EGU General Assembly 2019*, Vienna, Austria, April 7–12, 2019.
- [C90] Florian A. Schneider, **Ariane Middel**, Saud AlKhaled, Björn Hagen, Paul Coseo, 50 Grades of Shade – Assessment of engineered and natural shade in hot dry communities. *EGU General Assembly 2019*, Vienna, Austria, April 7–12, 2019.
- [C89] Saud AlKhaled, Paul Coseo, Chingwen Cheng, Anthony J. Brazel, **Ariane Middel**, Predictors of Urban Induced Heating under the full Evolution of the Diurnal Cycle, Poster presented March 27, 2019 at the *2nd annual Urban Climate Research Center Poster Symposium*, Tempe, Arizona, 2019.
- [C88] Florian A. Schneider, **Ariane Middel**, Saud AlKhaled, Björn Hagen, Paul Coseo, 50 Grades of Shade –Assessment of Engineered and Natural Shade in Hot Dry Communities, Poster presented March 27, 2019 at the *2nd annual Urban Climate Research Center Poster Symposium*, Tempe, Arizona, 2019.
- [C87] Yujia Zhang, **Ariane Middel**, Billie L. Turner II, Evaluating the effects of vertical urban forms on diurnal land surface temperatures using Google Street View images. Poster presented January 11, 2019 at the *21st Annual CAP LTER Poster Symposium*, Tempe, Arizona, 2019.
- [C86] Yuliya Dzyuban, Maggie Messerschmidt, Heather Fischer, Angela Ellsworth, Patricia Solis, Jennifer Vanos, **Ariane Middel**, and David Hondula, Mapping thermal comfort in Edison Eastlake Neighborhood with citizen scientists. Poster presented January 11, 2019 at the *21st Annual CAP LTER Poster Symposium*, Tempe, Arizona, 2019.
- [C85] Yuliya Dzyuban, David M. Hondula, Charles Redman, **Ariane Middel**, Analyzing transit-based heat exposure and behaviors to enhance urban climate adaptation and mitigation strategies in the southwest USA. Poster presented January 11, 2019 at the *21st Annual CAP LTER Poster Symposium*, Tempe, Arizona, 2019.
- [C84] Yuliya Dzyuban, David M. Hondula, **Ariane Middel**, Analyzing Public Transit Based Heat Exposure, Perception and Behaviors to Enhance Climate Adaptation and Mitigation Strategies in the Southwest USA, *99th AMS Annual Meeting*, Phoenix, Arizona, January 6–10, 2019.
- [C83] Yujia Zhang, **Ariane Middel**, Billie L. Turner II, Evaluating the effects of vertical urban forms on diurnal land surface temperatures using Google Street View images, *99th AMS Annual Meeting*, Phoenix, Arizona, January 6–10, 2019.
- [C82] Christopher G. Hoehne, David M. Hondula, Mikhail Chester, David Eisenman, **Ariane Middel**, Andrew Fraser, Lance E. Watkins, Katrina Gerster, Heat Exposure during Outdoor Activities in the United States Varies Significantly by City, Demography, and Activity, *99th AMS Annual Meeting*, Phoenix, Arizona, January 6–10, 2019.

- [C81] David Hondula, Mikhail Chester, **Ariane Middel**, Andrew Fraser, David Eisenman, Christopher G. Hoehne, Lance E. Watkins, Katrina Gerster, Simulating Personal Heat Exposure in Cities with the ICARUS Model, *99th AMS Annual Meeting*, Phoenix, Arizona, January 6–10, 2019.
- [C80] Samuel Meltzer, Matei Georgescu, Ashley M. Broadbent, Jennifer Vanos, **Ariane Middel**, Impact of Trees on Urban Canyon Microclimate, *99th AMS Annual Meeting*, Phoenix, Arizona, January 6–10, 2019.
- [C79] Lolya A. McWest, Ashley M. Broadbent, Jennifer Vanos, Matei Georgescu, **Ariane Middel**, Impacts of Urban Tree Canopy and Water Features on the Thermal Environment, Poster presented at the *99th AMS Annual Meeting*, Phoenix, Arizona, January 6–10, 2019.
- [C78] Jennifer Vanos, Robert D. Brown, **Ariane Middel**, Makoto Yokahari, Eichi Kosaka, and Akiko Iida, The Tokyo 2020 Olympic Marathons: Spectator Thermal Comfort and Health in the Face of Extreme Heat, *99th AMS Annual Meeting*, Phoenix, Arizona, January 6–10, 2019.
- [C77] Peter J. Crank, Melissa Wagner, Anthony Brazel, **Ariane Middel**, Martin Smith, Dani Hoots, An Evaluation of Mean Radiant Temperature Estimations in an Arid Urban Climate, Poster presented at the *2018 AGU Fall Meeting*, Washington, D.C., December 10–14, 2018.
- [C76] Matthias Demuzere, Benjamin Bechtel, Jason Ching, **Ariane Middel**, Gerald Mills, Frieke Van Coillie, Marie-Leen Verdonck, Local Climate Zones and their Potential as a Heat Assessment Tool, *2018 AGU Fall Meeting*, Washington, D.C., December 10–14, 2018.
- [C75] Bjoern Hagen, Saud AlKhaled, Paul Coseo, **Ariane Middel**, 50 Grades of Shade – Assessment of engineered and natural shade in hot dry communities, Poster presented at the *10th International Conference on Urban Climate (ICUC-10)*, New York, August 6–10, 2018.
- [C74] **Ariane Middel**, Jonas Lukaczyk, Scott Krayenhoff, Ross Maciejewski, Level 1 UCP Data from Google Street View and Applications in Biometeorology, *10th International Conference on Urban Climate (ICUC-10)*, New York, August 6–10, 2018.
- [C73] Anthony J. Brazel, **Ariane Middel**, Built Environment Contributions to the Mean Radiant Temperature Variations in Downtown Tempe, Arizona on an Extreme Heat Day, *10th International Conference on Urban Climate (ICUC-10)*, New York, August 6–10, 2018.
- [C72] Scott E. Krayenhoff, Ashley M. Broadbent, Evyatar Erell, Lei Zhao, Matei Georgescu, Alberto Martilli, **Ariane Middel**, David Sailor, James A. Voogt, Urban cooling from heat mitigation strategies: Systematic review of the numerical modeling literature, *10th International Conference on Urban Climate (ICUC-10)*, New York, August 6–10, 2018.
- [C71] Mehdi P. Heris, **Ariane Middel**, Do Planning and Design Strategies and Procedures matter in microclimate management and urban heat mitigation? *10th International Conference on Urban Climate (ICUC-10)*, New York, August 6–10, 2018.
- [C70] Jason Ching et al., Characterizing and generating WUDAPT Level 1 UCP data, *10th International Conference on Urban Climate (ICUC-10)*, New York, August 6–10, 2018.
- [C69] Lolya A. McWest, Ashley M. Broadbent, **Ariane Middel**, Jennifer Vanos, Matei Georgescu, Impacts of Urban Tree Canopy and Water Features on a Semi-Arid Thermal Environment, Poster presented at the *UWIN Annual Meeting*, Colorado State University – Fort Collins, Colorado, July 30 – August 1, 2018.

[C68] Samuel Meltzer, Matei Georgescu, Jennifer Vanos, **Ariane Middel**, Ashley M. Broadbent, David Hondula, Impact of Trees on Urban Canyon Microclimate, Poster presented at the *UWIN Annual Meeting*, Colorado State University – Fort Collins, Colorado, July 30 – August 1, 2018.

[C67] Zoé Hamstead, Paul Coseo, Josh Wilson, Braden Kay, Gregory Gill, David Hondula, Rosa Inchausti, **Ariane Middel**, Bianca Shaw, Grace Kelly, Nick Rajkovich, RI-8: Special Session: Thermal Extremes, Smart & Connected Management of Thermal Extremes Framework (Panel Discussion), *International Symposium for Sustainable Systems and Technology (ISSST) 2018*, Buffalo, New York, June 25-28, 2018.

[C66] Mehdi Aminipouri, Kirsten Zickfeld, Anders Knudby, **Ariane Middel**, Scott Krayenhoff, Urban microclimate modelling for evaluating the impact of heat mitigation measures on pedestrian thermal comfort: case of Vancouver's local climate zones, *EGU General Assembly 2018*, Vienna, Austria, April 8–13, 2018.

[C65] Chuyuan Wang, Soe Myint, **Ariane Middel**, Shai Kaplan, Anthony Brazel, Jonas Lukasczyk, Assessing Local Climate Zones in Arid Cities: The Case Study of Phoenix, Arizona and Las Vegas, Nevada, *AAG Annual Meeting*, New Orleans, Louisiana, April 10–14, 2018.

[C64] **Ariane Middel**, Jonas Lukasczyk, Urban Form and Composition of Street Canyons: A Human-Centric Big Data and Deep Learning Approach, *AAG Annual Meeting*, New Orleans, Louisiana, April 10–14, 2018.

[C63] Yujia Zhang, **Ariane Middel**, B.L. Turner II, Evaluating the effects of vertical urban forms on local climate variations using Google Street View, *AAG Annual Meeting*, New Orleans, Louisiana, April 10–14, 2018.

[C62] Yujia Zhang, **Ariane Middel**, Billie L. Turner II, Evaluating the effects of vertical urban forms on land surface temperature using Google Street View, Poster presented January 5, 2018 at the *20th Annual CAP LTER Poster Symposium*, Tempe, Arizona, 2018.

[C61] Jennifer Vanos, Robert Brown, Eichi Kosaka, Akiko Lida, Makato Yokohari, Kaoru Matsuo, **Ariane Middel**, Projected Heat Stress along the 2020 Olympic Marathon Route in Tokyo, Japan, and the Role of Microclimatic Design, *International Congress of Biometeorology*, Durham, UK, September 5, 2017.

[C60] David Hondula, Mario Chavez, **Ariane Middel**, Jennifer Vanos, John Harlow, Erik Johnston, Lance Watkins, Impact of Heat on Public Transportation Use and Satisfaction in Phoenix, AZ: A mixed methods assessment, *American Public Health Association (APHA) 2017 Annual Meeting & Expo*, November 4–8, 2017.

[C59] **Ariane Middel**, Jonas Lukasczyk, Sky View Factor Footprints from Synthetic Fisheye Photos for Urban Canopy Parameterization, *UWIN Annual Meeting*, Fort Collins, Colorado, July 31–August 2, 2017.

[C58] Mary Wright, David Hondula, **Ariane Middel**, Jennifer Vanos, Matei Georgescu, Tiffany Justice, Usha Bhalla, The Influence of Urban Landscape on Thermal Comfort in the City, *UWIN Annual Meeting*, Fort Collins, Colorado, July 31 – August 2, 2017.

[C57] Michelle N. Poletti, **Ariane Middel**, Jennifer Vanos, Impact of interior temperatures of shaded and unshaded vehicles on children's health: A case study in Phoenix, AZ, *Ecological Society of America (ESM) Annual Meeting*, Portland, Oregon, August 6–11, 2017.

- [C56] **Ariane Middel**, Chuyuan Wang, Shai Kaplan, Jonas Lukasczyk, Soe Myint, Anthony J. Brazel, Local Climate Zones in Arid Cities—An Assessment for Phoenix, AZ and Las Vegas, NV, USA, *AAG Annual Meeting*, Boston, Massachusetts, April 5–9, 2017.
- [C55] Anthony J. Brazel, **Ariane Middel**, Microclimate 1930 to Now in Tempe, AZ, *AAG Annual Meeting*, Boston, Massachusetts, April 5–9, 2017.
- [C54] David M. Hondula, Mario Chavez, John Harlow, **Ariane Middel**, Erik W. Johnston, Jennifer K. Vanos, Thermal Comfort and Shade Provision at City of Phoenix Bus Stops, *AAG Annual Meeting*, Boston, Massachusetts, April 5–9, 2017.
- [C53] **Ariane Middel**, Thermal comfort, mean radiant temperature, and shade in hot dry climates, *5th Jeffrey Cook Workshop on Desert Architecture*, Ben-Gurion University of the Negev, Israel, March 8, 2017.
- [C52] **Ariane Middel**, Scott Krayenhoff, Directional Contributions to the Radiant Temperature Environment Measured During Record-Breaking Extreme Heat in Tempe, AZ, *97th AMS Annual Meeting*, Seattle, Washington, January 22–26, 2017.
- [C51] Kathrin Feige, **Ariane Middel**, Scott Krayenhoff, Benjamin L. Ruddell, Tim Albring, Nicolas R. Gauger, Evaluating SU2 for Simulation of Urban Canopy Layer Flow, *97th AMS Annual Meeting*, Seattle, Washington, January 22–26, 2017.
- [C50] Melissa Davidson, Elizabeth Cook, David M. Iwaniec, Marta Berbes, Matt Boylan, Matei Georgescu, Nancy B. Grimm, Scott Krayenhoff, Xiaoxiao Li, **Ariane Middel**, Brandon Ramirez, and David A. Sampson. Exploring outcomes and assessing tradeoffs of co-developed sustainable future scenarios for the central Arizona-Phoenix region. Poster presented January 13, 2017 at the *19th Annual CAP LTER Poster Symposium*, Tempe, Arizona, 2017.
- [C49] **Ariane Middel**, Jonas Lukasczyk, Pedestrian Thermal Comfort Maps from Synthetic Fisheyes – A Case Study in Phoenix, Arizona, *ACSP 56th Annual Conference*, Portland, November 3-6, 2016.
- [C48] **Ariane Middel**, Nancy J. Selover, Björn Hagen, Nalini Chhetri, Impact of Photovoltaic Canopy Shade on Outdoor Thermal Comfort in a Hot Desert City, *EGU General Assembly 2016*, Vienna, Austria, April 17–22, 2016.
- [C47] Zoe Cayetano, Ryan Taylor, Christian Monahan, Elijah Campbell, Kelsey O’Brien, Rebecca Lydford, Amy Dicker, **Ariane Middel**, Björn Hagen, The Influence of Vegetation and Built Environments on Midday Summer Thermal Comfort, Poster presented January 15, 2016 at the *18th Annual CAP LTER Poster Symposium*, Tempe, Arizona, 2016.
- [C46] **Ariane Middel**, Nancy J. Selover, Björn Hagen, Nalini Chhetri, How to Stay Cool in the Desert - The Benefits of Photovoltaic Canopy Shade, *AAG Annual Meeting*, San Francisco, California, March 29–April 2, 2016.
- [C45] Anthony Brazel, **Ariane Middel**, Evaluation of an Urban Network (AZMET) in the Phoenix Metro Area, *AAG Annual Meeting*, San Francisco, California, March 29–April 2, 2016.
- [C44] **Ariane Middel**, Jennifer Vanos, Benjamin L. Ruddell, Time-Detrending Surface Temperature Observations from Mobile Transects – A Sensitivity Analysis, *96th AMS Annual Meeting*, New Orleans, Louisiana, January 10–14, 2016.

- [C43] Nancy J. Selover, **Ariane Middel**, Nalini Chhetri, Ben Mackowski, C.J. Sisodiya, How Much Can Solar Shade Structures Reduce Interior Automobile Temperatures? *96th AMS Annual Meeting*, New Orleans, Louisiana, January 10–14, 2016.
- [C42] Melissa Wagner, Anthony J. Brazel, **Ariane Middel**, Thermal Comfort and Extreme Heat: A Summertime Assessment of RayMan Model Sensitivity in Downtown Tempe, AZ, *96th AMS Annual Meeting*, New Orleans, Louisiana, January 10–14, 2016.
- [C41] **Ariane Middel**, Xiaoxiao Li, Remote Sensing of the Surface Urban Heat Island and Land Architecture in Phoenix, Arizona: Combined Effects of Land Composition and Configuration and Cadastral-Demographic-Economic Factors, Poster presented at *AGU Fall Meeting*, San Francisco, December 14–16, 2015.
- [C40] Subhrajit Guhathakurta, **Ariane Middel**, Energy and Urban Form Explored Through Dynamic Networked Infrastructure Model, *ACSP 55th Annual Conference*, Houston, Texas, October 22–25, 2015.
- [C39] **Ariane Middel**, Nancy J. Selover, Nalini Chhetri, Björn Hagen, Outdoor Thermal Comfort Under Photovoltaic Canopies – A Seasonal Field Study at Arizona State University, *9th International Conference on Urban Climate (ICUC9)*, Toulouse, France, July 20–24, 2015.
- [C38] Jennifer Vanos, **Ariane Middel**, Benjamin L. Ruddell, Evan Kuras, A Multiscaler Thermal Analysis of Urban Playgrounds, *9th International Conference on Urban Climate (ICUC9)*, Toulouse, France, July 20–24, 2015.
- [C37] Kathrin Hüb, **Ariane Middel**, Benjamin L. Ruddell, Relationship Between Land Use and Microclimate Based on Mobile Transect Measurements, *9th International Conference on Urban Climate (ICUC9)*, Toulouse, France, July 20–24, 2015.
- [C36] Anthony J. Brazel, Katherine Crewe, **Ariane Middel**, Shai Kaplan, Mill Avenue, Tempe, AZ Downtown Microclimate – An APA-Designated Best Street. *9th International Conference on Urban Climate (ICUC9)*, Toulouse, France, July 20–24, 2015.
- [C35] **Ariane Middel**, Benjamin L. Ruddell, Kathrin Hüb, Seasonal and Diurnal Desert Microclimate Dynamics of Various Shade Tree and Surface Cover Combinations. *AAG Annual Meeting*, Chicago, Illinois, April 21–25, 2015.
- [C34] Kathrin Hüb, **Ariane Middel**, Benjamin Ruddell, Classifying Urban Microclimate Patches Based on Multitemporal Mobile Transect Observations. *AAG Annual Meeting*, Chicago, Illinois, April 21–25, 2015.
- [C33] Bjoern Hagen, Ariane Middel, David Pijawka, The Longitudinal Impact of Climate Related Hydro-Meteorological Disasters on Public Perception of Climate Change in the United States. *AAG Annual Meeting*, Chicago, Illinois, April 21–25, 2015.
- [C32] Nancy J. Selover, **Ariane Middel**, Nalini Chhetri, Benjamin Mackowski, Chhatrapalsinh Sisodiya, Impact of Solar Shade Structures on Automobile's Interior Temperatures. *AAG Annual Meeting*, Chicago, Illinois, April 21–25, 2015.
- [C31] **Ariane Middel**, Nancy Selover, Nalini Chhetri, Björn Hagen, Benjamin Mackowski, Chhatrapalsinh Jaydevsinh Sisodiya, Microclimate Effects of Photovoltaic Canopies: Ongoing Research Projects. Poster presented January 16, 2015 at the *17th Annual CAP LTER Poster Symposium*, Tempe, Arizona, 2015.

[C30] Kathrin Hüb, Benjamin L. Ruddell, **Ariane Middell**, Sensor Lag Correction for Mobile Air Temperature Measurements in an Urban Microclimate Context. Poster presented January 16, 2015 at the *17th Annual CAP LTER Poster Symposium*, Tempe, Arizona, 2015.

[C29] **Ariane Middell**, Nancy Selover, Nalini Chhetri, Björn Hagen, Outdoor Thermal Comfort under Photovoltaic Canopy Structures – A Field Study at Arizona State University. *Sixth Conference on Environment and Health, 95th AMS Annual Meeting*, Phoenix, Arizona, January 4–8, 2015.

[C28] Kenneth Galluppi, Hana Putnam, Nalini Chhetri, Nancy Selover, **Ariane Middell**, Informing Emergency and Risk Management with Climate Knowledge in Arid Urban Areas. *10th Symposium on Societal Applications: Policy, Research and Practice, 95th AMS Annual Meeting*, Phoenix, Arizona, January 4–8, 2015.

[C27] Kathrin Hüb, **Ariane Middell**, Benjamin L. Ruddell, Hans Hagen, Visual Analytics and Microclimate Analysis: A Use Case for a Visualization Tool Developed for Mobile Measurements. *31st Conference on Environmental Information Processing Technologies, 95th AMS Annual Meeting*, Phoenix, Arizona, January 4–8, 2015.

[C26] Donna A. Hartz, Ronald Pope, Gelas M. Simiyu, **Ariane Middell**, Peter Cheboss, Philip Raburu, Air Quality and Health Impacts: A Novel Approach to an International Cooperative Monitoring Project in Uasin Gishu County, Kenya. *Sixth Conference on Environment and Health, 95th AMS Annual Meeting*, Phoenix, Arizona, January 4–8, 2015.

[C25] Soe W. Myint, Baojuan Zheng, Chao Fan, Shai Kaplan, Anthony Brazel, **Ariane Middell**, Martin Smith, Exploring the Influence of Built and Vegetative Features on Urban Warming and Cooling: Does Spatial Arrangement Matter? *20th Conference on Satellite Meteorology and Oceanography, 95th AMS Annual Meeting*, Phoenix, Arizona, January 4–8, 2015.

[C24] Matthew C. Roach, Nalini Chhetri, Wen-Ching Chuang, Nancy Selover, David M. Hondula, **Ariane Middell**, Alex Karner, Building Resilience Against Climate Effects in Arizona: Lessons Learned Implementing CDC's BRACE Framework. *Sixth Conference on Environment and Health, 95th AMS Annual Meeting*, Phoenix, Arizona, January 4–8, 2015.

[C23] Soe W. Myint, Baojuan Zheng, Chao Fan, Shai Kaplan, Anthony Brazel, **Ariane Middell**, Martin Smith, Does the Spatial Arrangement of Vegetation and Anthropogenic Land Cover Features Matter? Case Studies of Urban Warming and Cooling in Phoenix and Las Vegas. *AGU Fall Meeting*, San Francisco, California, December 15–19, 2014.

[C22] **Ariane Middell**, Shai Kaplan, Kathrin Hüb, Anthony J. Brazel, The Daytime Oasis Effect of Desert Cities - The Case Study of Las Vegas, NV. *UGEC*, Taipei, Taiwan, November 6–9, 2014.

[C21] **Ariane Middell**, Shai Kaplan, Anthony J. Brazel, Impact of Land Cover on Local Climate - The Case Study of Las Vegas, NV. *AAG Annual Meeting*, Tampa, Florida, April 8–12, 2014.

[C20] Björn Hagen, **Ariane Middell**, David Pijawka, The Impact of Recent Climate-Related Hydro-Meteorological Disasters on Public Perception of Climate Change in the US. *AAG Annual Meeting*, Tampa, Florida, April 8–12, 2014.

[C19] Kathrin Hüb, **Ariane Middell**, Benjamin L. Ruddell, Source Area Computation for Microclimate Measurements in the Urban Canopy Layer. *AAG Annual Meeting*, Tampa, Florida, April 8–12, 2014.

- [C18] **Ariane Middel**, Kathrin Hüb, Anthony J. Brazel, Chris A. Martin, Benjamin L. Ruddell, Linking Shading Patterns of Trees in Phoenix, AZ to Thermal Comfort. Poster presented at the *11th Symposium on the Urban Environment, 95th AMS Annual Meeting*, Atlanta, Georgia, February 2014.
- [C17] **Ariane Middel**, Kathrin Hüb, Benjamin L. Ruddell, Anthony J. Brazel, Chris A. Martin, Understanding the Physical Dynamics of Microclimate: Ongoing Research Projects. Poster presented January 17, 2014 at the *16th Annual CAP LTER Poster Symposium*, Tempe, Arizona, 2014.
- [C16] Kathrin Hüb, **Ariane Middel**, Benjamin L. Ruddell, Visualizing Urban Transect Data. Poster presented January 17, 2014 at the *16th Annual CAP LTER Poster Symposium*, Tempe, Arizona, 2014.
- [C15] Stephanie Schweitzer, **Ariane Middel**, Wenwen Zhang, Urban Transport Energy Consumption Explored Through 3D Arc Maps. Poster presented at *IEEE VisWeek 2013*, Visualization, October 13–18, Atlanta, Georgia, 2013.
- [C14] Björn Hagen, **Ariane Middel**, David Pijawka, The Importance of Public Climate Change Perceptions for the Successful Implementation of Mitigation and Adaptation Planning Strategies to Improve Resiliency. *Planning for Resilient Cities and Regions, AESOP/ACSP Congress*, July 15–19, Dublin, Ireland, 2013.
- [C13] Björn Hagen, **Ariane Middel**, David Pijawka, Rick van Schoick, Bi and Multinational Partnership Models for Sustainability Education: What Works? *CONAHEC's 15th North American Higher Education Conference*, May 1–3, 2013, Edmonton, Canada.
- [C12] **Ariane Middel**, Kathrin Hüb, Anthony J. Brazel, Chris Martin, Subhrajit Guhathakurta, Impact of Urban Form and Design on Mid-Afternoon Microclimate in Phoenix Neighborhoods. Poster presented January 11, 2013 at the *15th Annual CAP LTER Poster Symposium*, Tempe, Arizona, 2013.
- [C11] **Ariane Middel**, Kathrin Hüb, James P. Erickson, Anthony J. Brazel, Chris Martin, Subhrajit Guhathakurta, Impact of Microclimate on Residential Energy Consumption in Different Phoenix Arizona Neighborhood Types. Poster presented October 4, 2012 at the *PhD Design, Environment, and the Arts Student Research Poster Exhibit*, Tempe, Arizona, 2012.
- [C10] **Ariane Middel**, Anthony J. Brazel, Shai Kaplan, Soe W. Myint, Summer Nighttime Cooling and Cooling Efficiency in Phoenix, AZ. Poster presented January 13, 2012 at the *14th Annual CAP LTER Poster Symposium*, Tempe, Arizona, 2012.
- [C9] Patricia Gober, **Ariane Middel**, Anthony Brazel, Soe Myint, Heejun Chang, Jiunn-Der Duh, Lily House-Peters, Tradeoffs Between Water Conservation and Temperature Amelioration in Phoenix and Portland: Implications for Urban Sustainability. *2011 AAG Annual Meeting*, April 12, 2011, Seattle, Washington.
- [C8] Stephane Frijia, Subhrajit Guhathakurta, Eric Williams, **Ariane Middel**, Re-Examining the Life Cycle Energy of Residences: Functional Unit, Technological Dynamics and Scaling. *COURS Poster Session*, Arizona State University, Tempe, Arizona, 2011.
- [C7] Stephane Frijia, Subhrajit Guhathakurta, Eric Williams, **Ariane Middel**, Scaling Behavior of the Life Cycle Energy of Residences. Poster presented February 20, 2011 at the *Decision Making Under Uncertainty (DMUU) Session of the AAAS Annual Meeting*, Washington, DC, 2011.

[C6] **Ariane Middel**, Anthony J. Brazel, Patricia Gober, Soe W. Myint, Heejun Chang, Juinn-Der Duh, Impacts of Weather Variability on Turbulent Heat Fluxes in Phoenix, AZ and Portland, OR. Poster presented at the *January 13, 2011 13th Annual CAP LTER Poster Symposium*, Tempe, Arizona, 2011.

[C5] Stephane Frijia, Eric Williams, Subhrajit Guhathakurta and **Ariane Middel**, Scaling Behavior of the Life Cycle Energy of Residential Buildings and Impacts on Greenhouse Gas Emissions. Poster presented at the *January 13, 2011 13th Annual CAP LTER Poster Symposium*, Tempe, Arizona, 2011.

[C4] Anthony J. Brazel, Katherine Crewe, **Ariane Middel**, Tradeoffs Between Water and Heat in Phoenix, Arizona - Toward a More Climatically Sustainable City. *32nd Annual Meeting of the Applied Geographers Organization (AGC)*, October 28–31, Baton Rouge, LA, 2009.

[C3] **Ariane Middel**, Peter-Scott Olech, Re-Tooling Urban Planners - Google Earth as Planning Support Tool, *8th International Symposium (UPE 8) of the International Urban Planning and Environment Association*, March 23–26, Kaiserslautern, Germany, 2009.

[C2] **Ariane Middel**, Robert Pahle, Peter-Scott Olech, Hans Hagen, Policy-Driven Visualization of Urban Forms for Planning Support, *IEEE VisWeek 2008*, Visualization, Oct. 19–24, Columbus, Ohio, 2008.

[C1] **Ariane Middel**, Visualizing Urban Futures, *3rd Annual IRTG Workshop on "Visualization of Large and Unstructured Data Sets"*, September 29, Kaiserslautern, Germany, 2008.

Invited Presentations

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| 04/2021 | Artificial Turf & Heat
<i>Presentation to CEAG Member Municipalities (with Jennifer Vanos), April 13, 2021</i> |
| 04/2021 | Solar reflective pavements—A policy panacea to heat mitigation
<i>Climate Specialty Group John Russell Mather Paper of the Year Presentation, AAG Annual Meeting 2021, virtual, April 7–11, 2021</i> |
| 03/2021 | 2021 FSE NSF CAREER Workshop
<i>Panelist, March 26, 2021</i> |
| 03/2021 | Urban Heat (Island)
<i>Presentation for AZ Sustainability Alliance, March 20, 2021</i> |
| 02/2021 | Global Heat Health Information Network (GHHIN) Masterclass 5.1 - Understanding urban heat: Urban climate science background
<i>Webinar presenter (with Edith de Guzman, Matthias Roth, Heinke Schliünzen, Jennifer Vanos), February 17, 2021</i> |
| 09/2020 | Heat Exposure in the Southwest: Exploring Mitigation Strategies from a Pedestrian Perspective
<i>Presenter at the Climate Adaptation Research Symposium, UCLA Luskin Center for Innovation, September 21, 2020</i> |

- 09/2020 **Case Critical Series: Killer Heat in COVID Times**
Webinar moderator and presenter (with Juan Decllet-Barreto, Mark Hartman, Masavi Parea), September 3, 2020
- 04/2019 **Urban Climate Informatics – an emerging research field**
Invited Keynote, Session “Urban climate, urban biometeorology, and science tools for cities”, European Geophysical Union, Vienna, Austria, April 2019.
- 01/2019 **Healthy Urban Environments: A Review of ASU Heat, Air, and Water Research**
Panelist, Healthy Urban Environments Initiative, Arizona State University, Memorial Union, January 29, 2019
- 10/2018 **Urban Heatscapes Explored — From Human Experience to Big Data**
Seminar, Future Cities Lab, National University of Singapore (NUS), November 1, 2018
- 09/2018 **Assessing Neighborhood Shade for a Walking Intervention: Use of Google Street View**
Invited Attendee and Co-Presenter, Exercise Science and Skin Cancer Prevention Research Meeting, National Cancer Institute (NCI), Shady Grove, MD, September 26-27, 2018
- 10/2017 **Outdoor Thermal Comfort Explored**
Invited Seminar Speaker, CHAOS Lab, Princeton University, School of Architecture & Andlinger Center for Energy and the Environment, October 18, 2017
- 09/2017 **Urban Form and Thermal Comfort**
ASU-City of Phoenix (COP) Cooler Phoenix Symposium, City of Phoenix, September 29, 2017
- 03/2017 **Thermal Comfort, Mean Radiant Temperature, and Shade in Hot Dry Climates**
5th Jeffrey Cook Workshop on Desert Architecture, Ben-Gurion University of the Negev, Israel, March 8, 2017
- 02/2017 **Beat the heat – Examples of urban climate research to build “climate smart” cities**
Department of Geography and Environmental Sustainability, University of Oklahoma, February 27, 2017
- 03/2016 **How to Stay Cool in the Desert: Examples of Urban Climate Research at the Local and Microscale**
Information Science and Technology Seminar Speaker Series, Los Alamos National Lab, March 7, 2016
- 05/2016 **Impact of Urban Form and Vegetation on Microclimate and Thermal Comfort in Hot Desert Environments**
Seminar, Nanjing University, China, May 25, 2016

Teaching

Fall 2021	Object Oriented Programming and Data Structures <i>CSE 205, Arizona State University</i>
Spring 2021	Digital Culture Capstone I & II <i>AME 485/486, Arizona State University</i>
Fall 2020	Sensible Heatscapes <i>AME 494, SOS 494, GPH 494/598, Arizona State University</i>
Spring 2020	Sensible Heatscapes <i>AME 494/598, Arizona State University</i>
	Urban Climate Informatics <i>CSE 591, Arizona State University</i>
Spring 2019	Sensible Heatscapes <i>AME 494/598, Arizona State University</i>
Spring 2018	Geovisualization <i>GUS 5073, Temple University</i>
Fall 2017	Fundamentals of GIS <i>GUS 5062, Temple University</i>
Fall 2015	Climatology and Planning <i>GPH/PUP 498/591, Arizona State University</i>
Spring 2012	Research Methods for PhD Students <i>Department of Computer Science, Visualization group, University of Kaiserslautern, Germany</i>

Guest Lectures

11/2020	Human Thermal Exposure in Cities - Novel Sensing and Modeling to Build Heat-Resilience <i>SenSIP Seminar Series, Arizona State University</i>
11/2020	Human Thermal Exposure in Cities - Novel Sensing and Modeling to Build Heat-Resilience <i>Hydrosystems Engineering Seminar Series, School of Sustainable Engineering and the Built Environment, Arizona State University</i>
10/2020	Human Thermal Exposure in Cities: The Role of Urban Design <i>ARCH7130 Research Studio, Northeastern University, Boston</i>
10/2020	Human Thermal Exposure in Cities - Novel Sensing and Modeling to Build Heat-Resilience <i>SCaRP Fall Research Seminar Series, School of City & Regional Planning, GeorgiaTech</i>

- 11/2019 **Sustainable Urban Design in Hot Desert Cities**
SOS 510: Perspectives on Sustainability, Arizona State University
- 10/2019 **The Tokyo 2020 Olympic Marathons: Spectator Thermal Comfort and Health in the Face of Extreme Heat**
Faculty Cross Talk: Design and Sports, Global Sports Institute, Arizona State University
- 03/2019 **How to stay cool in the desert: Examples of bioclimatic research in Phoenix**
GPH 213: Climate and Weather, Arizona State University
- 02/2019 **Sensible Heatscapes**
Visiting students from PennDesign, University of Pennsylvania
- 11/2018 **Sensible Heatscapes – Introduction to the SHADE Research Lab**
Digital Culture Speaker Series, Arizona State University
- 10/2018 **The UHI and Sustainability Science: Causes, Impacts, and Solutions**
SOS 111: Sustainable Cities, Arizona State University (Polytechnic Campus)
- 10/2018 **Sensible Heatscapes – Introduction to the SHADE Research Lab**
CEE 591: Environmental Engineering, Arizona State University
- 02/2018 & 11/2017 **The UHI and Sustainability Science: Causes, Impacts, and Solutions**
PUP 190/SOS 111: Sustainable Cities, Arizona State University
- 02/2017 & 11/2016 **The UHI and Sustainability Science: Causes, Impacts, and Solutions**
PUP 190/SOS 111: Sustainable Cities, Arizona State University
- 09/2016 **Impact of Urban Form, Design, and Landscaping on Microclimate and Comfort: Microclimate Modeling and Field Observation Studies in Phoenix**
PUP 442: Environmental Planning
- 03/2016 & 11/2015 **The UHI and Sustainability Science: Causes, Impacts, and Solutions**
PUP 190/SOS 111: Sustainable Cities, Arizona State University
- 10/2015 **The Hot and Cold of It: Environmental Research in Extreme Climates**
GPH 212: Introduction to Meteorology
- 09/2015 **Urban Heat Island Mitigation**
PUP 598: Environmental Planning, Arizona State University
- 04/2015 **Impact of Urban Form, Design, and Landscaping on Microclimate and Thermal Comfort: Microclimate Modeling and Field Observation Studies**
PUP 591: Cool Cities, Arizona State University
- 11/2014 **Impact of Vegetation and Urban Form on Neighborhood Microclimate and Water Use: Examples of Modeling and Field Observation Studies in Phoenix**
GPH 591: Urban Climate, Arizona State University
- 11/2014 **Urbanization and the Urban Heat Island (UHI)**
Guest Lecture, GPH 314: Global Change, Arizona State University
- 10/2014 **The UHI and Sustainability Science: Causes, Impacts, and Solutions**
Guest Lecture, PUP 190/SOS 111: Sustainable Cities, Arizona State University

- 04/2014 **Planning for Cooler Cities: Heat Mitigation in Phoenix Through Landscape and Urban Design**
Guest Lecture, PUP 591: Cool Cities, Arizona State University
- 04/2013 **Planning for Cooler Cities: Microclimate Modeling**
Guest Lecture, PUP 591: Cool Cities, Arizona State University
- 10/2012 **Climate Modeling in Urban Planning**
Guest Lecture, PUP 571, Arizona State University

Mentoring

Current Graduate Advisees (+ = advanced to candidacy)

Timothy Aiello, M.Sc. 2021, Environmental Sciences, University of Guelph (committee member)
 Karthik Kashinath Kulkarni, M.S. 2021, Computer Engineering, Arizona State University (co-chair)
 +Florian Arwed Schneider, Ph.D. 2022, Sustainability, Arizona State University (chair)
 +Mary Wright, Ph.D. 2022, Geography, Arizona State University (committee member)
 Thornton Bates, M.S. 2022, Sustainability, Arizona State University (committee member)
 Matthew Huff, M.S. 2022, Computer Science, Arizona State University (chair)
 Rui Li, Ph.D. 2022, Sustainable Engineering, Arizona State University (committee member)
 Zachary Van Tol, Ph.D. 2024, Sustainability, Arizona State University (co-chair)
 Gisel Guzman, Ph.D. 2024, Geography, Arizona State University (co-chair)

Completed Graduate Theses

Peter Crank, Ph.D. 2021, Geography, Arizona State University (committee member)
 Dania Tahir Alarfaj, MA, 2020, Interior Architecture, Arizona State University (committee member)
 Fernando Piyum, Ph.D. 2020, Arts, Media and Engineering, Arizona State University (committee member)
 Saud AlKhaled, Ph.D. 2019, Architecture, Arizona State University (committee member)
 Mehdi Aminipouri, Ph.D. 2019, Geography, Simon Fraser University (committee member)
 Abdullah Ali A Aldakheelallah, M.S. 2019, Architecture, Arizona State University (committee member)
 Nicole Burkard, M.S. 2019, Computer Science, University of Kaiserslautern (co-chair)
 Mehdi P. Heris, Ph.D. 2018, Geography, University of Colorado Denver (committee member)
 Yujia Zhang, Ph.D. 2018, Geography, Arizona State University (committee member)
 Sophie Zakrzewski, M.S. 2017, Computer Science, University of Kaiserslautern (co-chair)
 Kaylee Colter, M.S. 2016, Applied Biological Sciences, Arizona State University (committee member)
 Kathrin Hüb, Ph.D. 2015, Computer Science, University of Kaiserslautern (co-chair)
 Stephanie Schweitzer, M.S. 2013, Computer Science, University of Kaiserslautern (committee member)

Current Undergraduate Advisees

Garrett Storey, B.S. 2023, Barrett Honors College, Arizona State University (internship advisor)
 Kayshavi Bakshi, B.S. 2023, Barrett Honors College, Arizona State University (internship advisor)
 Maya Muir, B.S. 2021, Computer Science, Arizona State University (thesis co-chair)
 Johnny J. Cordova, B.S. 2021, Civil Engineering, Arizona State University (student worker)
 Maddie Potts, B.A. 2022, Barrett Honors College, Arizona State University (internship advisor)
 Erin Epel, B.A. 2023, Barrett Honors College, Arizona State University (internship advisor, student worker)
 Jacob Lachapelle, B.S., 2021, Environmental Sciences, University of Guelph (committee member)
 Ananth Udupa, B.A. 2022, Barrett Honors College, Arizona State University (past internship advisor, student worker)

Completed Undergraduate Theses

Alex Minotto, B.A. 2021, Barrett Honors College, Arizona State University (chair)
Julia Marturano, B.A. 2021, Barrett Honors College, Arizona State University (chair)
Ema Shqalsi, B.A. 2017, Barrett Honors College, Arizona State University (co-chair)

REUs

Roshni Deb, B.S. 2024, Computer Science, Arizona State University (REU, 2021)
Katharina Roth, B.S. 2020, Computer Science, University of Kaiserslautern, Germany (REU, 2020)
Eric Kinner, B.S. 2019, Computer Science, University of Kaiserslautern, Germany (REU, 2019)
Lolya McWest, B.S. 2020, Environmental Science, Rutgers University (REU, 2018)
Samuel Meltzer, B.S. 2019, Geography, Arizona State University (REU, 2018)
Michelle Poletti, B.S. 2019, Civil Engineering, Florida International University (REU, 2016)

Visiting Students/Researchers Supervised

Isaac Newton Kwasi Buo, Ph.D. 2022, Geoinformatics, University of Tartu, Estonia (visiting scholar, 2021-2022)
Mansoureh Gholami, Ph.D. 2021, Ag Engineering, University of Bologna, Italy (visiting scholar, 2021)
Lasya Sreenivasan, 12th grade, Paradise Valley Highschool District (intern, summer 2020)
Shreya Banerjee, Ph.D. 2020, Architecture, IIT Kharagpur, India, (visiting scholar, 2019)
Jonas Lukaszcyk, Ph.D. 2019, Computer Science, University of Kaiserslautern (visiting scholar, 2015-2018)
Kathrin Feige, Post-Doc, Computer Science, University of Kaiserslautern (visiting scholar, 2015-2017)

Student Groups Supervised

Digital Culture Capstone group “Thermal Threat VR”, Arts, Media and Engineering (Fall 2019)
Digital Culture Capstone group “Mobile Smart Garden”, Arts, Media and Engineering (Spring 2019)
“Cows are cute” elementary school robotics group, Christ the King Catholic School, Mesa (Fall 2019)
NASA Develop group “Thermal Landscapes and Greening Initiatives in Tempe”, Arizona (Fall 2018)
Digital Culture Capstone group “LightBike”, Arts, Media and Engineering (Fall 2018)
NASA CubeSat mission, co-advisor for UG “science team”, SESE, Arizona State University (2016-2017)
PUP 190/SOS 101 Honors student recitation (Fall 2015)
Engineering Projects in Community Service (EPICS), Arizona State University (Fall 2013)

Student Workers Supervised

Ali Alyakoob, Ph.D. 2024, Sustainable Engineering, Arizona State University (01/2021 – present)
Matthew Huff, B.S. 2020, Computer Science, Arizona State University (07/2020 – 12/2020)
Deepti Paul, M.S. 2021, Software Engineering, Arizona State University (06/2020 – 10/2020)
Megs Seeley, Ph.D. 2023, Geography, Arizona State University (summer 2020)
Gautamdev Chaudhary, M.S. 2020, Computer Science, Arizona State University, (02/2020 – 04/2020)
Lei Zhang, M.S. 2019, Computer Science, Arizona State University (06/2018 – 05/2019)
Aman Srivastava, M.S. 2017, Software Engineering, Arizona State University (03/2017 – 09/2017)
Ben Mackowski, B.S. 2016, Engineering, Arizona State University (06/2014 – 01/2016)

Professional Memberships

2016, 2019	EGU (European Geosciences Union)
2015 – present	ISB (International Society of Biometeorology)
2015 – 2017	AGU (American Geophysical Union)

2013 – present	AMS (American Meteorological Society)
2011 – present	IAUC (International Association for Urban Climate)
2011 – present	AAG (Association of American Geographers) and Climate Specialty Group
2011 – present	IEEE (Institute of Electrical and Electronics Engineers)
2011 – 2016	APA (American Planning Association)
2001 – present	DVW (German Surveying Association)

Peer-Reviewer

Advances in Atmospheric Sciences, Annals of GIS, Atmosphere, Buildings, Climatic Change, Computers, Environment and Urban Systems, Energies, Environment and Planning B, Environmental Health Perspectives, Environmental Research, EnvirVIS conference, EuroVis Conference, Eurographics, IEEE Symposium on Visualization, International Journal of Biometeorology, International Journal of Climatology, ISPRS International Journal of Geo-Information, Journal of Digital Earth, Journal of Horticulture and Forestry, Journal of Sustainable Development, Journal of Urban Ecology, Journal of Urban Forestry and Urban Greening, Journal of Urban Technology, Landscape and Urban Planning, Landscape Research, Remote Sensing, Science of the Total Environment, Sustainability, The Egyptian Journal of Remote Sensing and Space Sciences, Theoretical and Applied Climatology, Urban Climate, Urban Forestry and Urban Greening

Professional Service

2021	Session Chair, Actionable Heat and Health Science for Improved Decision-Making, <i>101st AMS Annual Meeting</i> , New Orleans (virtual), Louisiana, January 10–14, 2021
2020 – present	Guest editor, Frontiers Special Topic Collection “Urban Climate informatics”
2020 –	Board member, AMS Built Environment (BUE)
2020	Session Co-Chair, Outcome-Focused Urban Climate Research for Community Resilience, <i>100th AMS Annual Meeting</i> , Boston, Massachusetts, January 12–16, 2020
2019 – 2022	Executive Board member (Treasurer), International Association for Urban Climate (IAUC)
2019, 2020	Poster Judge, ASU Urban Climate Research Center, Student Poster Competition
2019	Poster Judge, CAP LTER Annual Poster Symposium
2019	Session Co-Chair, Phoenix as a Sandbox for Studying Urban Climate in Arid Regions, <i>99th AMS Annual Meeting</i> , Phoenix, Arizona, January 6–10, 2019
2018	Session Chair, Biometeorology IV, <i>10th International Conference on Urban Climate (ICUC-10)</i> , New York, August 6–10, 2018.
2017	Workshop Co-chair, EnvirVIS 2017, Barcelona, Spain, June 12-16, 2017
2016 – 2019	Elected Board member, International Association for Urban Climate (IAUC)
2016 – present	Leadership team member, Urban Climate Research Center, Arizona State University
2016	Workshop Co-chair, EnvirVIS 2016, Groningen, Netherlands, June 6-10, 2016

- 2015 Workshop Co-chair, EnvirVIS 2015, Cagliari, Italy, May 25-26, 2015
- 2014 Program Committee, EnvirVIS 2014, Swansea, UK, June 9-13, 2014
- 2013 Scientific Committee, CUPUM 2013, Utrecht, Netherlands, July 2-5, 2013
- 2011 Co-organizer, Annual IRTG Workshop, Kaiserslautern, Germany, June 10-11, 2011
- 1998 – 2003 Board member of the German Geodesy student society ARGEOS

Public Service

[M73] Les Echos (February 2021): Climat: À Phoenix, le rude combat pour faire baisser la température
<https://www.lesechos.fr/weekend/business-story/climat-a-phoenix-le-combat-pour-faire-baisser-la-temperature-1290764>

[M72] Arizona State Press (November 2020): ASU team joins Phoenix in fighting extreme heat through cooler pavement
<https://www.statepress.com/article/2020/11/spbiztech-asu-team-assists-phoenix-conducting-testing-cool-pavement>

[M71] Ahwatukee Foothills News (October 2020): Extreme heat could be with us for years
https://www.ahwatukee.com/news/article_e3239d40-13de-11eb-ad67-73369e53265f.html

[M70] Tuscon Sentinel (October 2020): Arizona will have more 'extreme heat' days, researchers say
http://www.tucson sentinel.com/local/report/101220_az_heat_predictions/arizona-will-have-more-extreme-heat-days-researchers-say/

[M69] AZ Family (September 2020): Researchers detect 160-degree radiant temperature at Phoenix homeless encampment
https://www.azfamily.com/weather/extreme_heat/researchers-detect-160-degree-radiant-temperature-at-phoenix-homeless-encampment/article_f2033b48-f6ee-11ea-920b-c3a764fe1214.html

[M68] ASU Now, AZ Big Media (August 2020): Devilishly Hot | The hottest — and coolest — spots on ASU campus
<https://asunow.asu.edu/20190614-discoveries-hottest-spots-on-asu-tempe-campus>
<https://azbigmedia.com/lifestyle/the-hottest-and-coolest-spots-on-asu-campus/>

[M67] ASU Now, ASU Full Circle (August 2020): ASU and Zimin Foundation Partner for Future of Urban Tech (Developing Urban Cooling Strategies for a Hot Metropolis)
<https://asunow.asu.edu/20200803-asu-and-zimin-foundation-partner-future-urban-tech>
<https://fullcircle.asu.edu/fulton-schools/asu-and-zimin-foundation-partner-for-future-of-urban-tech/>

[M66] Cronkite News (July 2020): Efforts to cool Phoenix include pale pavement coating to reflect sunlight
<https://cronkitenews.azpbs.org/2020/07/28/phoenix-cool-pale-pavement-coating/>

[M65] KJZZ (July 2020): How Reflective Paint Can Combat The Urban Heat Island Effect
<https://kjzz.org/content/1603782/how-reflective-paint-can-combat-urban-heat-island-effect>

[M64] 12 News (July 2020): Phoenix using 'cool pavement' to try and lower temperatures
<https://t.co/QsJmTCGCEU?amp=1>

- [M63] ASU Now (June 2020): Keeping kids cool on the playground
<https://asunow.asu.edu/20200626-solutions-keeping-kids-cool-playground>
- [M62] Fox 10 News (May 2020): Mobile weather station can measure how a person experiences heat
<https://www.fox10phoenix.com/news/mobile-weather-station-can-measure-how-a-person-experiences-heat>
- [M61] AZ Family/CBS (May 2020): Heat myth busters: What can/can't explode or melt in your car during extreme heat
https://www.azfamily.com/news/heat-myth-busters-what-can-cant-explode-or-melt-in-your-car-during-extreme-heat/article_fa79094a-9ef3-11ea-860e-47f0ada1190c.html
- [M60] Arizona Republic (May 2020): 'Cool pavement' experiments help urban planners find ways to ease rising temperatures
<https://www.azcentral.com/story/news/local/arizona-environment/2020/05/15/climate-change-cool-pavement-tool-fighting-excessive-heat-heatwaves-arizona/3121783001/>
- [M59] ASU Now (May 2020): Street smarts required in heat mitigation
<https://asunow.asu.edu/20200505-discoveries-street-smarts-required-heat-mitigation>
- [M58] UCLA (May 2020): On-the-ground guidance for L.A.'s far-reaching climate strategy
<https://newsroom.ucla.edu/releases/on-the-ground-guidance-for-cool-streets>
- [M57] ASU Now (April 2020): Tracking a Silent Killer
<https://asunow.asu.edu/20200416-tracking-silent-killer>
- [M56] ASU Now (March 2020): ASU receives 15 NSF CAREER awards
<https://asunow.asu.edu/20200330-asu-news-asu-receives-15-nsf-career-awards>
- [M55] CAP LTER Network (March 2020): Thinking about long-term futures to make better decisions today
<https://lternet.edu/stories/thinking-about-long-term-futures-to-make-better-decisions-today/>
- [M54] UCLA Luskin School of Public Affairs (October 2019): Street Art Meets Climate Science in the Big, Blue Face of Zeus
<https://luskin.ucla.edu/street-art-meets-climate-science-in-the-big-blue-face-of-zeus>
- [M53] CBS/3TV (October 2019): ASU researcher finds white 'cool pavements' actually make YOU hotter
https://www.azfamily.com/asu-researcher-finds-white-cool-pavements-actually-make-you-hotter/article_fea549c4-ec9d-11e9-9937-db4c17fae358.html
- [M52] CityLab (October 2019): The Problem With 'Cool Pavements': They Make People Hot
<https://www.citylab.com/environment/2019/10/cool-pavement-materials-coating-urban-heat-island-research/599221/>
- [M51] Le Matin Dimanche (September 2019): Assommée par la chaleur, la ville de Phoenix vit la nuit
<https://epaper.lematindimanche.ch/index.cfm/epaper/1.0/share/default?defId=200&publicationDate=2019-09-22&newspaperName=Le%20Matin%20Dimanche&pageNo=14&articleId=101105746&signature=82A65116BB48769E4C7935C5981C7B4DCD9B3F06>
- [M50] Euro1 (September 2019): Il est 22 heures et il fait 31 degrés: à Phoenix, le réchauffement climatique force les habitants à vivre la nuit
<https://www.europe1.fr/international/il-est-22-heures-et-il-fait-31-degres-a-phoenix-le-rechauffement-climatique-force-les-habitants-a-vivre-la-nuit-3920738>

- [M49] NPR Here & Now (September 2019): Phoenix Residents Will Need To Adapt To An Even Hotter Climate
<https://www.wbur.org/hereandnow/2019/09/18/phoenix-arizona-hotter-climate-change>
- [M48] Fox 10 News (September 2019): ASU professor studies how different types of shade can help keep us cool in the heat
<https://www.fox10phoenix.com/news/asu-professor-studies-how-different-types-of-shade-can-help-keep-us-cool-in-the-heat>
- [M47] University of Guelph News (September 2019): Keeping Pedestrians Cool Focus of First-Ever U of G Research
<https://news.uoguelph.ca/2019/09/keeping-pedestrians-cool-focus-of-first-ever-u-of-g-research/>
- [M46] KTAR (September 2019): ASU researchers say shade is not all created equal
<https://ktar.com/story/2714082/arizona-researchers-say-shade-is-not-all-created-equal/>
- [M45] Cronkite News (August 2019): 50 grades of shade: Researchers find that it's not all created equal
<https://cronkitenews.azpbs.org/2019/08/29/climate-change-research-shade/>
- [M44] AZ Family (August 2019): 'Shadow hunter': ASU climatologist helps others find shade from Arizona sun
https://www.azfamily.com/shows/good_morning_arizona/field_trip_friday/shadow-hunter-asu-climatologist-helps-others-find-shade-from-arizona/article_28135ec0-c5a9-11e9-a87d-ab77ee26b4a7.html
- [M43] New York Times (August 2019): As Phoenix Heats Up, the Night Comes Alive
<https://www.nytimes.com/interactive/2019/climate/phoenix-heat.html>
- [M42] ASU Now (August 2019): Tips to rave the dog days of summer
<https://asunow.asu.edu/20190801-sun-devil-life-summer-heat-tips-dutch>
- [M41] ASU Cronkite News (July 2019): 50 Grades of Shade
<https://www.youtube.com/watch?v=uaBu7pnFMNw&feature=youtu.be>
- [M40] ASU Now (July 2019): Keeping Olympic marathon spectators cool
<https://asunow.asu.edu/20190709-solutions-asu-scientists-working-keep-tokyo-olympic-marathon-spectators-cool>
- [M39] ASU Now (June 2019): The hottest and coolest spots on campus
<https://asunow.asu.edu/20190614-discoveries-hottest-spots-on-asu-tempe-campus>
- [M38] ASU Now (May 2019): Summer in the City
<https://asunow.asu.edu/20190523-solutions-summer-city-asu-extreme-heat-research>
- [M37] ABC15 (May 2019): ASU creates new technology to research how heat impacts our bodies
<https://www.abc15.com/news/region-southeast-valley/tempe/asu-creates-new-technology-to-research-how-heat-impacts-our-bodies>
<https://www.youtube.com/watch?v=EJUpNupHK7U>
- [M36] Places (April 2019): Shade (by Sam Bloch)
<https://placesjournal.org/article/shade-an-urban-design-mandate/>
- [M35] Catalyst PBS (April 2019): Car interior temperature
<https://azpbs.org/catalyst/2019/04/catalyst-car-interior-temperature/>

[M34] ASU Now (October 2018): ASU researchers develop tool to help determine a neighborhood's walkability

<https://asunow.asu.edu/20181023-asu-researchers-develop-tool-help-determine-neighborhoods-walkability>

[M33] Youtube (September 2018): HeatMappers Walk and Ride

<https://www.youtube.com/watch?v=xPcht1fPn-8>

<https://vimeo.com/298651337>

[M32] KJZZ (September 2018): Sweating For Science: Walkers Help Find Solutions To Urban Heat

<http://kjzz.org/content/706336/sweating-science-walkers-help-find-solutions-urban-heat>

[M31] KJZZ (September 2018): Researchers Looking For More Localized Data On Urban Heat Island

<https://theshow.kjzz.org/content/695042/researchers-looking-more-localized-data-urban-heat-island>

[M30] AZ Family (July 18, 2018): City of Tempe testing ways to mitigate extreme heat

<http://www.azfamily.com/story/38678950/city-of-tempe-prepares-for-future-heat>

[M29] ASU Now (July 2018): ASU researchers helping Tempe deal with extreme-heat events

<https://asunow.asu.edu/20180719-arizona-impact-asu-researchers-helping-tempe-deal-extreme-heat-events>

[M28] ASU Now (May 2018): New research from ASU and UC San Diego measured air and surface temperatures of cars parked in sun and shade

<https://asunow.asu.edu/20180516-discoveries-asu-study-hot-cars-can-hit-deadly-temperatures-within-one-hour>

[M27] UC San Diego Health (May 2018): Hot Cars Can Hit Life-Threatening Levels in Approximately One Hour

<https://health.ucsd.edu/news/releases/Pages/2018-05-24-hot-cars-hit-life-threatening-levels-in-approximately-one-hour.aspx>

[M26] NBC News (May 2018): Hot cars and kids: Study shows killer temps hit in an hour

<https://www.nbcnews.com/health/health-news/hot-cars-kids-study-shows-killer-temps-hit-hour-n876916>

[M25] KJZZ (January 2018): Studying Extreme Weather's Impact On Cities, From Hot To Cold

<https://kjzz.org/content/591457/studying-extreme-weathers-impact-cities-hot-cold>

[M24] University of Buffalo News (December 2017): Climate change and the tale of two cities

<http://www.buffalo.edu/news/releases/2017/12/002.html>

[M23] AZ Central (October 2017): This park in hot south Phoenix neighborhood is getting more trees

<http://www.azcentral.com/story/news/local/arizona-environment/2017/10/26/sherman-parkway-hot-south-phoenix-neighborhood-getting-more-trees/786336001/>

[M22] AZ Central (October 2017): How we measured heat in different parts of Maricopa County

<http://www.azcentral.com/story/news/local/arizona-environment/2017/10/19/how-we-measured-heat-different-parts-maricopa-county/777639001/>

[M21] AZ Central (October 2017): Here's how heat discriminates, and what Phoenix is doing to help those at risk

<http://www.azcentral.com/story/news/local/arizona-environment/2017/10/19/heres-how-heat-discriminates-what-phoenix-doing-help-those-risk/561116001/>

- [M20] EHP Science Selection (September 2017): From Ambient to Personal Temperature: Capturing the Experience of Heat Exposure
<https://ehp.niehs.nih.gov/ehp2469/>
- [M19] Alliance for Community Trees News (July 2017): Mobile Weather Station Maps Most Comfortable Route
<https://actreesnews.org/alliance-for-community-trees-news/mobile-weather-station-maps-comfortable-route/>
- [M18] ASU Cronkite News (July 2017): Mobile weather cart collecting Tempe temperature data
<https://youtu.be/IJAFOrCD6o>
<https://cronkitenews.azpbs.org/2017/07/31/july-31-2017-newscast/>
- [M17] The Real News (July 2017): Is Extreme Heat the New Normal?
<https://therealnews.com/stories/oleon0721extremeheat>
- [M16] ABC 15 (June 2017): Shade or proximity: What's more important to you when parking?
<http://www.abc15.com/news/region-southeast-valley/tempe/shade-or-proximity-whats-more-important-to-you-when-parking-arizona-state-professor-explains>
- [M15] KTAR (June 2017): ASU researcher hopes shade-tracking tool will help pedestrians
<https://ktar.com/story/1632046/asu-researcher-creates-machine-tracks-shade/>
- [M14] AZ Central (June 2017): Arizona's heat is getting worse — and it's killing people
<http://www.azcentral.com/story/news/local/arizona-environment/2017/06/24/arizona-deadly-summer-heat-getting-worse/424598001/>
- [M13] Fox 10 News (June 2017): ASU professor creating app to show routes on campus with the most shade
<http://www.fox10phoenix.com/news/arizona-news/263559944-story>
- [M12] CBS 5/3TV (June 2017): Shade research could help cool down pedestrians' routes
- [M11] ASU News (June 2017): Shadow hunting: ASU urban climatologist helps us keep our cool
<https://asunow.asu.edu/20170530-solutions-asu-climatologist-shade-measuring-method>
- [M10] ASU News (September 2016): Staying cool: The science of shade
<https://asunow.asu.edu/20160914-staying-cool-au-science-shade>
- [M9] University of Kaiserslautern Unispectrum (September 2016): Vom Klassenzimmer in der Pfalz in die Weiten Arizonas
<http://www.unispectrum.de/forschen/vom-klassenzimmer-in-der-pfalz-in-die-weiten-arizonas>
- [M8] San Angelo Standard-Times (Texas) (July 2016): Cooling off playgrounds - A little shade will go a long way to protect children
<http://www.gosanangelo.com/news/scene/it-gets-hot-on-the-playground-38250896-ed13-6938-e053-0100007f41db-388751181.html>
- [M7] UGEC Viewpoints (March 2016): Transforming desert playgrounds into urban oases
<https://ugecviewpoints.wordpress.com/2016/03/22/transforming-desert-playgrounds-into-urban-oases/>
- [M6] Science Daily (November 2015): Dangerously hot playground temperatures explored by researcher
<https://www.sciencedaily.com/releases/2015/11/151111172514.htm>

[M5] Texas Tech Today (November 2015, July 2016): Dangerously Hot Playground Temperatures Explored by Researcher

<http://today.ttu.edu/posts/2015/11/hot-playground-temperatures-explored-by-researcher>

<http://today.ttu.edu/posts/2016/07/hot-playground>

[M4] ASU News (September 2015): Made in the shade: ASU team crunches data on how best to cool urban areas

<https://asunow.asu.edu/content/made-shade-asu-team-crunches-data-how-best-cool-urban-areas>

[M3] ASU News (March 2014): Changing climate in your own backyard

<https://asunow.asu.edu/content/changing-climate-your-own-backyard>

[M2] ASU News (February 2014): ASU report contributes to water reuse policy dialogue

<https://asunow.asu.edu/content/asu-report-contributes-water-reuse-policy-dialogue>

[M1] ASU News (December 2009): ASU hosts second Chinese science delegation

<https://asunow.asu.edu/content/asu-hosts-second-chinese-science-delegation>

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