

Ariane Middel, Ph.D.

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Education

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

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

Appointments

- 2023 – present **Associate Professor**
School of Arts, Media and Engineering | School of Computing and Augmented Intelligence, Arizona State University
Assistant Director for Research
Global Futures Laboratory
- 2018 – present **Global Futures Scientist, Global Futures Laboratory**
Faculty Affiliate, School of Geographical Sciences and Urban Planning | School of Sustainability | The Design School
Graduate Faculty, School of Sustainability | School of Geographical Sciences and Urban Planning | Civil, Environmental and Sustainable Engineering | Computer Engineering
Honors Faculty, Barrett Honors College
- 2018 – 2023 **Assistant Professor**
School of Arts, Media and Engineering | School of Computing and Augmented Intelligence, Arizona State University
- 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 **Climate Solutions Center Staff**
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

Research Interests

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

Awards

2024	AAG Media Achievement Award (American Association of Geographers)
2023	Timothy Oke Award, International Association for Urban Climate (IAUC) Award for early-to mid-career researchers for excellence in research and leadership
2022	“Innovative Transportation Solutions Project of the Year” award, recognizing outstanding contributions of women in advancing transportation excellence, Phoenix's Cool Pavement Program
2022	“Arizona Forward Crescordia Award” in the Climate Action Solutions, Phoenix's Cool Pavement Program
2021	John Russell Mather Paper of the Year Award, AAG Climate Specialty Group, for paper “Solar reflective pavements—A policy panacea to heat mitigation”
2020	NSF CAREER: Human thermal exposure in cities – Novel sensing and modeling to build heat-resilience

Grants (Funded)

03/2024 – 02/2026	Global Centers Track 2: Heat Adaptation Co-PI (33%), National Science Foundation, with Jennifer Vanos (PI), Melissa Guardaro, \$249,999.
10/2022 – 09/2027	Southwest Urban Corridor Integrated Field Laboratory (SW-IFL) Senior Personnel (4%), Department of Energy, with David Sailor (PI), Enrique Vivoni, Matei Georgescu, Patricia Solis, \$25,000,000.
12/2022 – 11/2028	LTER: CAP V: Investigating how relationships between urban ecological infrastructure and human-environment interactions shape the structure and function of urban ecosystems Senior Personnel (1%), National Science Foundation, with Daniel Childers (PI), Rebecca Ball, Nancy Grimm, Kelli Larson, Billie Turner, \$7,649,990.
09/2022 – 08/2026	NSF LEAP-HI: Dynamic sensing and computational approaches to assess individual-level heat risk across diverse populations Co-PI (33%), National Science Foundation, with Konrad Rykaczewski (PI), Jennifer Vanos, \$2,000,000.
11/2021 – 04/2023	City of Phoenix: Cool Pavement pilot program phase 2 PI (40%), City of Phoenix, with Jennifer Vanos, Kamil Kaloush, David Sailor, David Hondula, \$161,722.
08/2021 – 07/2023	MRI: Acquisition of a high heat compatible sweating thermal manikin Co-PI (12%), National Science Foundation, with Konrad Rykaczewski (PI), Jennifer Vanos, David Sailor, Stravos Kavouras, Dongwoo Yeom, \$500,000.
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 (ASU internal grant)

	Co-PI (33%), Fulton Schools of Engineering, with Konrad Rykaczewski (PI), Jennifer Vanos, \$25,000.
07/2021 – 08/2022	Healthy Urban Environments Initiative (HUE): Online decision-making tool for active shade management in the Southwest (ASU internal grant) PI (33%), HUE, with Braden Kay, Paul Coseo, Katja Brundiers, \$34,972.21.
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.
11/2020 – 06/2023	Cool Kids, Cool Places, Cool Futures: Community-based, arts-enhanced, and youth-focused approach for equitable urban cooling and emergency management Senior Personnel (0%), Robert Wood Johnson Foundation, with Paul Coseo (PI), Katja Brundiers, Wanda Dalla Costa, Maria Jackson, \$109,995.
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 – 06/2021	City of Phoenix: Cool Pavement pilot program (ASU internal grant) PI (20%), HUE, with Jennifer Vanos, Kamil Kaloush, David Sailor, David Hondula, \$24,647.
07/2020 – 06/2021	City of Phoenix: Cool Pavement pilot program PI (20%), City of Phoenix, with Jennifer Vanos, Kamil Kaloush, David Sailor, David Hondula, \$99,998.
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, \$50,000.
06/2020 – 05/2025	CAREER: Human thermal exposure in cities – Novel sensing and modeling to build heat-resilience PI (100%), National Science Foundation, \$524,999.
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 (University of Massachusetts, Amherst), Tauhidur Rahman (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, 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, Jennifer Vanos, \$49,986.
- 07/2019 – 12/2020 **Healthy Urban Environments Initiative (HUE): The right shade in the right place (ASU internal grant)**
PI (100%), HUE, \$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, \$10,796.00.
- 12/2016 – 11/2018 **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, \$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 – 12/2022 **Microclimate data collection, analysis, and visualization**
PI (100%), Computer Graphics and HCI Group, University of Kaiserslautern, \$158,101.
- 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, Nancy J. Selover, \$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, \$15,000.
- 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, CDC Building Resilience Against Climate Effects (BRACE) program, agreement #ADHS15-077418, with Nalini Chhetri (PI), Matthew Roach, David Hondula, Nancy J. Selover, \$125,000.
- 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, Huei-Ping Huang, Anthony J. Brazel, Dan Blumberg, \$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, \$350,213.

Grants (Pending)

- 03/2024 – 02/2025 **Urban Heat Navigator: A Human-Centric Heat Stress Forecasting and Routing System for Climate-Resilient Cities**
PI (100%), AWS, \$131,136.
- 08/2024 – 07/2029 **Schmidt Science Polymath Program**
PI (100%), Schmidt Futures, \$2,500,000.
- 12/2023 – 11/2026 **Center for HeatReady Communities**
Co-PI (17%), UCLA (NOAA), with Sara Meerow (PI), Jennifer Vanos, Glenn Sheriff, \$227,002.
- 09/2023 – 08/2024 **Impacts of climate change on sleep and gut microbiome development, and weight gain in infancy**
Co-PI (16%), HHS: National Institutes of Health (NIH), with Megan Petrov (PI), Li Liu, Alex Mohr, Jennifer Vanos, Corrie Whisner, \$551,261.

Grants (Declined)

- 07/2023 – 06/2026 **Developing and Testing Plans, Policies, and Actions for Cooling Riyadh**
Co-PI (25%), Kingdom of Saudi Arabia: Royal Commission for Riyadh City (RCRC), with David Sailor (PI), Amy Frazier, Paul Coseo, \$1,768,421.
- 10/2023 – 09/2026 **Exploring LCLUC impacts on the urban heat and air quality in U.S. metropolitan areas**
Co-PI (33%), NASA, with Jiwei Li (PI), Sean Bryan, \$707,998.
- 07/2023 – 06/2026 **High-resolution climate modeling to characterize future heat wave dynamics across southwestern US urban environments**
Senior Personnel (15%), NOAA, with Matei Georgescu (PI), Francisco Salamanca Palou, Mohamed Moustauoui, \$594,467.
- 07/2023 – 06/2026 **YFA Beat the heat: Photovoltaic shade to create local cool islands**
PI (100%), DOD-DARPA, \$900,197.
- 09/2023 – 08/2026 **ETD: ExtremeHeat: Middle School Teacher Professional Development with Sustainability**
Co-PI (20%), National Science Foundation, with Suren Jayasuriya (PI), Andreas Spanias, Terri Kurz, \$499,997.
- 01/2023 – 12/2025 **NSF PDM: Projecting extreme summer urban rainfall under climate change and urban expansion**
Co-PI (33%), National Science Foundation, with Matei Georgescu (PI), Francisco Salamanca, \$749,202.
- 09/2022 – 08/2027 **NSF Engineering Research Center (ERC) for Urban Thermal Justice (UTJ)**
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.

09/2022 – 08/2025	NSF PDM: Projecting extreme summer urban rainfall under climate change and urban expansion Co-PI (33%), with Matei Georgescu (PI), Francisco Salamanca, \$688,919.
06/2022 – 05/2027	URoL:EN Rules that govern biodiversity-ecosystem function in changing urban socioecological networks PI (100%), subcontract with Temple University (National Science Foundation), with Hamil Pearsall (PI), \$14,931.
05/2022 – 04/2027	NSF CSSI Frameworks: Unified Ubiquitous Urban (U3) modeling and design PI (100%), subcontract with University of Purdue, with Daniel Aliaga (PI), \$374,693.
05/2022 – 04/2025	EPA-G2021-STAR-H1: Navigating heat and air pollution exposure tradeoffs by guiding community transportation action plans Co-PI (16%), with Mikhail Chester (PI), Danae Hernandez-Cortes, David Hondula, David Sailor, Jennifer Vanos, \$1,350,000.
01/2022 – 12/2024	Tiny machine learning to address impact of extreme heat & air quality in Arizona Co-PI (30%), QualComm, with Suren Jayasuriya (PI), Andreas Spanias, \$1,215,002.
01/2022 – 04/2024	Developing and testing plans, policies, and actions for Cooling Riyadh Co-PI (33%), Kingdom of Saudi Arabia: Royal Commission for Riyadh City (RCRC), with David Sailor (PI), Paul Coseo, \$1,316,456.
01/2022 – 12/2025	SCC-IRG Track 1: Community-driven residential sensing networks 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 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.
10/2021 – 09/2026	SRS-RN Track 1: ReSET: Regional social-ecological-technological systems: Interdependencies, vulnerabilities, disruptions, and solutions for regional resilience to extreme events Senior Personnel (1%), National Science Foundation, with Nancy Grimm (PI), Mikhail Chester, \$15,000,000.
01/2021 – 12/2025	AI Institute: Institute of GeoAI and Augmented Mapping for Resilience Senior Personnel (5%), National Science Foundation, with Patricia Solis (PI), Gregory Asner, Wenwen Li, \$19,087,714.
08/2020 – 12/2021	Connecting neighborhoods: Understanding the impact of green active transportation PI (100%), University of Arizona (Prime Sponsor: National Institute for Transportation and Communities, with Nicole Iroz-Elardo (PI), \$9,997.

- 06/2020 – 05/2023 **NASA: Understanding diurnal cycles of the surface urban heat island effect and influences of urban landscape composition and configuration**
PI (85%), University of New Hampshire (Prime Sponsor: National Science Foundation, PI Jingfeng Xiao), with Billie Lee Turner, \$447,329.
- 03/2020 – 02/2024 **SCC-IRG Track 1: Convergent networks for thermally-comfortable and equitable communities**
Co-PI (20%), National Science Foundation, with Paul Coseo (PI), David M Hondula, Nikolas Smilovsky, Jennifer Vanos, Emmanuel Frimpong Boamah (University of Buffalo), Zoe Hamstead (University of Buffalo), \$3,861,528.
- 02/2020 – 02/2022 **Urban Climate Informatics (UCI) for human thermal exposure modeling**
PI (100%), SLOAN Foundation, \$75,000.
- 10/2019 – 09/2022 **CPS Small: Heat sensing and thermal routing for increased urban resilience**
PI (50%), National Science Foundation, with Suren Jayasuriya, \$499,999.
- 08/2019 – 07/2022 **RIDIR: Real-time assessment of urban thermal environments**
Co-PI (30%), National Science Foundation, with David Sailor (PI), WenWen Li, \$1,295,675.
- 08/2019 – 07/2022 **Advancing methods to assess individual-level ultraviolet radiation exposure during physical activity**
Co-PI (43%), National Institutes of Health, with Jennifer Vanos (PI), \$1,129,007.
- 06/2019 – 05/2022 **GSS: Social and biophysical drivers of climate regulation in New Urbanist and conventional neighborhoods**
ASU PI (100%), National Science Foundation, with V. Kelly Turner (UCLA PI), John Connors (TAMU PI), \$400,000 (ASU component \$113,574).
- 07/2018 – 06/2021 **Beat the heat: Big data approach to heat stress modeling for climate smart cities**
PI (100%), Johnson & Johnson WiSTEM2D Scholars Award Program, \$150,000.
- 08/2017 – 07/2020 **CNH-S: Outdoor physical activity and sustainability practices in the hot city**
Co-PI (22%), National Science Foundation, with David Hondula (PI), David Iwaniec, David Sailor, Amber Wutich, \$498,539.
- 05/2017 – 04/2019 **Temperature matters: Enhancing weather readiness in the Pac-12**
Co-PI (30%), Pac-12 Conference, with David Hondula (PI), Randall Cerveney, Nancy Selover, Joshua Beaumont, Ben McMahan, Jennifer Vanos, \$399,404.
- 04/2017 – 03/2020 **GP-IMPACT: Bridge into geosciences graduate studies**
Co-PI (12%), NSF, with David Sailor (PI), Randall Cerveney, Trisalyn Nelson, Ian Walker, \$398,668.
- 03/2017 – 08/2020 **CHAMP ASU ISA**
Co-PI (23%), Arizona Department of Health Services, with David Hondula (PI), Nalini Chhetri, Nancy Selover, \$100,000.
- 01/2017 – 06/2018 **Thermal performance of cool roof strategies in hot arid climates**
Co-PI (35%), The American Institute of Architects (AIA), with Paul Coseo (PI), Harvey Bryan, Jennifer Vanos, \$29,799.

- 11/2016 – 10/2019 **Global network for urbanization and the environment (GNUE)**
Co-PI (5%), NSF, with Christopher Boone (PI), Rimjhim Aggarwal, Mikhail Chester, Corrie Griffith, Kevin Gurney, Sharon Hall, Kelli Larson, Jose Lobo, Soe Myint, David Sailor, Shade Shutters, Billie Turner, Mark Watkins, Abigail York, \$961,352.
- 02/2016 – 01/2017 **Project beat the heat – Mapping a city's outdoor thermal comfort**
PI (100%), Google, Inc., \$69,010.

Publications

(*) indicates lead and/or corresponding authorship. Underscore in author list denotes mentored student. Metrics in brackets: [Impact Factor (IF) in year of publication, number of citations]

Peer-Reviewed Journal Articles

- [J97] Zachary Van Tol, Jennifer K. Vanos, **Ariane Middel**, Kristin M. Ferguson. (2024). Concurrent Heat and Air Pollution Exposures People Those Experiencing Homelessness, *Environmental Health Perspectives* <https://doi.org/10.1289/EHP13402> [IF 11.035]
- [J96] Ahmet Cilek, Muge Unal, **Ariane Middel**. (2024). The effects of 2-D and 3-D urban landscape metrics on mean radiant temperature in hot-arid Phoenix, Arizona, USA, *Sustainable Cities and Society* 101:105116 <https://doi.org/10.1016/j.scs.2023.105116> [IF 11.7, acceptance rate 10%]
- [J95] Mansoureh Gholami, **Ariane Middel**, Daniele Torreggiani, Patrizia Tassinari, Alberto Barbaresic. (2024). A hybrid Python model to evaluate the cooling impact of urban trees on human thermal comfort, *Building and Environment* 248:111054 <https://doi.org/10.1016/j.buildenv.2023.111054> [IF 7.4, acceptance rate 20%]
- [J94] Peter J. Crank, **Ariane Middel**, Paul Coseo, David J. Sailor. (2023). Microclimate impacts of neighborhood redesign in a desert community using ENVI-met and MaRTy, *Urban Climate* 52:101702 <https://doi.org/10.1016/j.uclim.2023.101702> [IF 6.4, acceptance rate 23%]
- [J93] Shaoqi Yang, Haiwei Yin, Ning Zhang, Taotao Tan, **Ariane Middel**, Hongqing Liu, Fanhua Kong. (2023). Carbon dioxide reduction from an intensive green roof through carbon flux observations and energy consumption simulations, *Sustainable Cities and Society* 99:104913 <https://doi.org/10.1016/j.scs.2023.104913> [IF 11.7, acceptance rate 10%]
- [J92] V. Kelly Turner, **Ariane Middel**, Jennifer Vanos. (2023). Shade is an essential solution for hotter cities, *Nature* 619 (7971):694–697 <https://doi.org/10.1038/d41586-023-02311-3> [IF 60.9]
- [J91] Anil Akin, Ahmet Çilek, **Ariane Middel**. (2023). Modelling tree canopy cover and evaluating the driving factors based on remotely sensed data and machine learning, *Urban Forestry and Urban Greening* 86:128035 <https://doi.org/10.1016/j.ufug.2023.128035> [IF 6.4, acceptance rate 21%]
- [J90] Xiandi Zheng, Fanhua Kong, Haiwei Yin, **Ariane Middel**, Hongqing Liu, Jing Huang, Ding Wang, Zhihao Wen. (2023). Green roof cooling and carbon mitigation benefits in a subtropical city, *Urban Forestry and Urban Greening* 86:128018 <https://doi.org/10.1016/j.ufug.2023.128018> [IF 6.4, acceptance rate 21%]
- [J89] Taotao Tan, Fanhua Kong, Haiwei Yin, Lauren M. Cook, **Ariane Middel**, Shaoqi Yang. (2023). Carbon dioxide reduction from green roofs: A comprehensive review of processes, factors, and

quantitative methods. *Renewable and Sustainable Energy Reviews*, 182:113412
<https://doi.org/10.1016/j.rser.2023.113412> [IF: 15.9]

[J88] Esra Suel, Emily Muller, James E Bennett, Tony Blakely, Yvonne Doyle, John Lynch, Joreintje D. Mackenbach, **Ariane Middel**, Anja Mizdrak, Ricky Nathvani, Michael Brauer, Majid Ezzati. (2023). Do poverty and wealth look the same the world over? A comparative study of 12 cities from five high-income countries, *EPJ Data Science* 12(1):19 <https://doi.org/10.1140/epjds/s13688-023-00394-6> [IF 4.4]

[J87] Jing Huan, Fanhua Kong, Haiwei Yin, **Ariane Middel**, Hongqing Liu, Michael E. Meadows. (2023). Green roof effects on urban building surface processes and energy budgets, *Energy Conversion and Management*, 287:117100 <https://doi.org/10.1016/j.enconman.2023.117100> [IF 10.4]

[J86] Isaac Buu, Valentina Sagris, Jaak Jaagus, **Ariane Middel**. (2023). High-resolution thermal exposure and shade maps for cool corridor planning, *Sustainable Cities and Society*, 93:104499
<https://doi.org/10.1016/j.scs.2023.104499> [IF 11.7, acceptance rate 10%,]

[J85] Florian A. Schneider, **Ariane Middel**, Jennifer K. Vanos, David J. Sailor. (2023). Evidence-based guidance on reflective pavement for urban heat mitigation: A case study in Phoenix, Arizona, *Nature Communication*, 14:1467 <https://doi.org/10.1038/s41467-023-36972-5> [IF 16.6]

[J84] Rui Li, Mikhail V. Chester, **Ariane Middel**, Jennifer K. Vanos, Danae Hernandez-Cortes, Isaac Buu, David M. Hondula. (2023). Effectiveness of travel behavior and infrastructure change to mitigate heat exposure, *Frontiers in Sustainable Cities*, 5 <https://doi.org/10.3389/frsc.2023.1129388> [IF: 2.8]

[J83] Renzhi Wu, Xiaoshan Fang, **Shuang Liu**, **Ariane Middel**. (2023). A fast and accurate mean radiant temperature model for courtyards: Evidence from the Keyuan Garden in central Guangdong, China, *Building and Environment*, 229:10916 <https://doi.org/10.1016/j.buildenv.2022.109916> [IF 7.4, acceptance rate 20%]

[J82] Ali Alyakoob, Sherly Hartono, Trevor Johnson, **Ariane Middel**. (2023). Estimating cooling loads of Arizona State University buildings using microclimate data and machine learning, *Journal of Building Engineering*, 64:105705 <https://doi.org/10.1016/j.jobe.2022.105705> [IF 7.1, acceptance rate 20%]

[J81] Rui Li, Mikhail Chester, David M. Hondula, **Ariane Middel**, Jennifer K. Vanos, Lance Watkins. (2023). Repurposing mesoscale traffic models for insights into traveler heat exposure, *Transportation Research Part D*, 114:103548 <https://doi.org/10.1016/j.trd.2022.103548> [IF 7.6]

[J80]* **Ariane Middel**, Matthew Huff, E. Scott Krayenhoff, Ananth Udupa, Florian A. Schneider. (2023). PanoMRT: Panoramic infrared thermography to model human thermal exposure and comfort, *Science of the Total Environment*, 859:160301, <https://doi.org/10.1016/j.scitotenv.2022.160301> [IF 9.8, acceptance rate 24%]

[J79] Gisel Guzman Echavarria, **Ariane Middel**, Jennifer Vanos. (2023). Beyond heat exposure - new methods to quantify and link personal heat exposure, stress, and strain in diverse populations and climates: The journal Temperature toolbox, *Temperature*, 10(3): 358–378
<https://doi.org/10.1080/23328940.2022.2149024> [IF 4.3]

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[C167] Devbrat Hariyani, **Ariane Middel**, Drought Prediction using Machine Learning, *FURI Poster Symposium*, Tempe, Arizona, November 17, 2023.

[C166] **Ariane Middel**, Nature-based and engineered solutions to overcome urban overheating – Lessons learned from a living laboratory in the Desert Southwest US, *International Workshop on Geography and Sustainability 2023 (GEOSUS 2023)*, Beijing, China, October 26–29, 2023.

[C165] Morgan Rogers, V. Kelly Turner, Yujia Zhang, **Ariane Middel**, Florian Schneider, Jonathon Ocon, Megs Seeley, John Dialesandro, More Than Surface Temperature: Mitigating Thermal Exposure in Hyper-local Land System, *2023 ACSP 63rd Annual Conference*, Chicago, Illinois, October 19–21, 2023.

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[C132] Christine B. Phillips, Akshar Patel, Alison Cantley, **Ariane Middel**, Marc A. Adams, An artificial intelligence approach to conducting pedestrian streetscape audits for physical activity, *International Society of Behavioral Nutrition and Physical Activity (ISBNPA) Conference*, Phoenix, AZ, May 18–21, 2022.

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[C123] Mansoureh Gholami, Alberto Barbaresi, **Ariane Middel**, Daniele Torreggiani, Patrizia Tassinari. Evaluating the impact of urban trees on thermal comfort in Imola, Italy and Tempe, USA, *23rd Annual CAP LTER Poster Symposium*, Tempe, Arizona, May 6, 2021.

[C122] 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.

[C121] 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 Haefelin, 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.

[C120] **Ariane Middel**, Human-scale measurements and modeling of heat exposure, *18th Annual Climate Prediction Applications Science Workshop*, Phoenix, Arizona, April 20–22, 2021.

[C119] 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.

[C118] **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.

[C117] 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 P. 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.

[C102] Stephen R. Elser, Nancy B. Grimm, **Ariane Middel**, Growing shade: Daytime cooling ecosystem services of common street trees in Phoenix. *22nd Annual CAP LTER Poster Symposium*, Tempe, Arizona, January 17, 2020.

[C101] 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. *22nd Annual CAP LTER Poster Symposium*, Tempe, Arizona, January 17, 2020.

[C100] 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. *22nd Annual CAP LTER Poster Symposium*, Tempe, Arizona, January 17, 2020.

[C99] **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.

[C98] V. Kelly Turner, **Ariane Middel**, Florian A. Schneider, Yujia Zhang, Matthew Stiller, Transformative Climate Communities (TCCs): Informing adaptation planning through cool urban design interventions in Southern California, *100th AMS Annual Meeting*, Boston, Massachusetts, January 12–16, 2020.

[C97] 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 Roustán, 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.

[C96] 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.

[C95] 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.

[C94] 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.

[C93] 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.

[C92] **Ariane Middel**, Matthias Demuzere, Urban Climate Informatics – An emerging research field, *8th Belgian Geographers Day*, Ghent, October 18, 2019.

[C91] 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.

- [C90] 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, *Annual ISSR Poster Symposium*, Tempe, Arizona, April 24, 2019.
- [C89] 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.
- [C88] **Ariane Middel**, Urban Climate Informatics – an emerging research field. *EGU General Assembly 2019*, Vienna, Austria, April 7–12, 2019.
- [C87] 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.
- [C86] Saud AlKhaled, Paul Coseo, Chingwen Cheng, Anthony J. Brazel, **Ariane Middel**, Predictors of urban induced heating under the full evolution of the diurnal cycle, *2nd annual Urban Climate Research Center Poster Symposium*, Tempe, Arizona, March 27, 2019.
- [C85] 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, *2nd annual Urban Climate Research Center Poster Symposium*, Tempe, Arizona, March 27, 2019.
- [C84] 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. *21st Annual CAP LTER Poster Symposium*, Tempe, Arizona, January 11, 2019.
- [C83] Yuliya Dzyuban, Maggie Messerschmidt, Heather Fischer, Angela Ellsworth, Patricia Solis, Jennifer Vanos, **Ariane Middel**, David Hondula, Mapping thermal comfort in Edison Eastlake Neighborhood with citizen scientists. *21st Annual CAP LTER Poster Symposium*, Tempe, Arizona, January 11, 2019.
- [C82] 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. *21st Annual CAP LTER Poster Symposium*, Tempe, Arizona, January 11, 2019.
- [C81] 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.
- [C80] 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.
- [C79] 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.
- [C78] 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.
- [C77] 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.

[C76] 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.

[C75] 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.

[C74] 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.

[C73] 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.

[C72] 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.

[C71] **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.

[C70] 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.

[C69] 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.

[C68] 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.

[C67] 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, Characterizing and generating WUDAPT Level 1 UCP data, 10th International Conference on Urban Climate (ICUC-10), New York, August 6–10, 2018.

[C66] 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.

[C65] 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.

[C64] 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 (Panel Discussion), *International Symposium for Sustainable Systems and Technology (ISSST)* 2018, Buffalo, New York, June 25-28, 2018.

[C63] 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.

[C62] 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.

[C61] **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.

[C60] 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.

[C59] Yujia Zhang, **Ariane Middel**, Billie L. Turner II, Evaluating the effects of vertical urban forms on land surface temperature using Google Street View, *20th Annual CAP LTER Poster Symposium*, Tempe, Arizona, January 5, 2018.

[C58] 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.

[C57] 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.

[C56] **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.

[C55] 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.

[C54] 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.

[C53] **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.

[C52] Anthony J. Brazel, **Ariane Middel**, Microclimate 1930 to now in Tempe, AZ, *AAG Annual Meeting*, Boston, Massachusetts, April 5–9, 2017.

[C51] 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.

[C50] **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.

[C49] **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.

[C48] 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.

[C47] Melissa Davidson, Elizabeth Cook, David M. Iwaniec, Marta Berbes, Matt Boylan, Matei Georgescu, Nancy B. Grimm, Scott Krayenhoff, Xiaoxiao Li, **Ariane Middel**, Brandon Ramirez, David A. Sampson. Exploring outcomes and assessing tradeoffs of co-developed sustainable future scenarios for the central Arizona-Phoenix region. *19th Annual CAP LTER Poster Symposium*, Tempe, Arizona, January 13, 2017.

[C46] **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.

[C45] **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.

[C44] 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, *18th Annual CAP LTER Poster Symposium*, Tempe, Arizona, January 15, 2016.

[C43] **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.

[C42] 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.

[C41] **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.

[C40] 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.

[C39] 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.

[C38] **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.

[C37] Subhrajit Guhathakurta, **Ariane Middel**, Energy and urban form explored through dynamic networked infrastructure model, *ACSP 55th Annual Conference*, Houston, Texas, October 22–25, 2015.

[C36] **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.

[C35] Jennifer Vanos, **Ariane Middel**, Benjamin L. Ruddell, Evan Kuras, A multiscale thermal analysis of urban playgrounds, *9th International Conference on Urban Climate (ICUC9)*, Toulouse, France, July 20–24, 2015.

[C34] Kathrin Häb, **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.

[C33] 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.

[C32] **Ariane Middel**, Benjamin L. Ruddell, Kathrin Häb, Seasonal and diurnal desert microclimate Dynamics of various shade tree and surface cover combinations. *AAG Annual Meeting*, Chicago, Illinois, April 21–25, 2015.

[C31] Kathrin Häb, **Ariane Middel**, Benjamin Ruddell, Classifying urban microclimate patches based on multitemporal mobile transect observations. *AAG Annual Meeting*, Chicago, Illinois, April 21–25, 2015.

[C30] 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.

[C29] 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.

[C28] **Ariane Middel**, Nancy Selover, Nalini Chhetri, Björn Hagen, Benjamin Mackowski, Chhatrapalsinh Jaydevsinh Sisodiya, Microclimate effects of photovoltaic canopies: Ongoing research projects, *17th Annual CAP LTER Poster Symposium*, Tempe, Arizona, January 16, 2015.

[C27] Kathrin Häb, Benjamin L. Ruddell, **Ariane Middel**, Sensor lag correction for mobile air temperature measurements in an urban microclimate context, *17th Annual CAP LTER Poster Symposium*, Tempe, Arizona, January 16, 2015.

[C26] **Ariane Middel**, 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.

[C25] Kenneth Galluppi, Hana Putnam, Nalini Chhetri, Nancy Selover, **Ariane Middel**, 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.

[C23] Kathrin Häb, **Ariane Middel**, 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.

[C263] Donna A. Hartz, Ronald Pope, Gelas M. Simiyu, **Ariane Middel**, 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.

[C22] Soe W. Myint, Baojuan Zheng, Chao Fan, Shai Kaplan, Anthony Brazel, **Ariane Middel**, 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.

[C21] Matthew C. Roach, Nalini Chhetri, Wen-Ching Chuang, Nancy Selover, David. M. Hondula, **Ariane Middel**, 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.

[C20] Soe W. Myint, Baojuan Zheng, Chao Fan, Shai Kaplan, Anthony Brazel, **Ariane Middel**, 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.

[C19] **Ariane Middel**, Shai Kaplan, Kathrin Häb, Anthony J. Brazel, The daytime oasis effect of desert cities - The case study of Las Vegas, NV. *UGEC*, Taipei, Taiwan, November 6–9, 2014.

[C18] **Ariane Middel**, 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.

[C17] Björn Hagen, **Ariane Middel**, 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.

[C16] Kathrin Häb, **Ariane Middel**, Benjamin L. Ruddell, Source area computation for microclimate Measurements in the Urban Canopy Layer. *AAG Annual Meeting*, Tampa, Florida, April 8–12, 2014.

[C15] **Ariane Middel**, Kathrin Häb, 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.

[C14] **Ariane Middel**, Kathrin Häb, Benjamin L. Ruddell, Anthony J. Brazel, Chris A. Martin, Understanding the physical dynamics of microclimate: Ongoing research projects. *16th Annual CAP LTER Poster Symposium*, Tempe, Arizona, January 17, 2014.

[C13] Kathrin Häb, **Ariane Middel**, Benjamin L. Ruddell, Visualizing urban transect data. *16th Annual CAP LTER Poster Symposium*, Tempe, Arizona, January 17, 2014.

[C12] Stephanie Schweitzer, **Ariane Middel**, Wenwen Zhang, Urban transport energy consumption explored through 3D arc maps. *IEEE VisWeek 2013*, October 13–18, Atlanta, Georgia, 2013.

[C11] 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.

[C10] 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*, Edmonton, Canada, May 1–3, 2013.

[C9] **Ariane Middel**, Kathrin Häb, Anthony J. Brazel, Chris Martin, Subhrajit Guhathakurta, Impact of urban form and design on mid-afternoon microclimate in Phoenix neighborhoods. *15th Annual CAP LTER Poster Symposium*, Tempe, Arizona, January 11, 2013.

[C8] **Ariane Middel**, Kathrin Häb, James P. Erickson, Anthony J. Brazel, Chris Martin, Subhrajit Guhathakurta, Impact of microclimate on residential energy consumption in different Phoenix Arizona neighborhood types. *PhD Design, Environment, and the Arts Student Research Poster Exhibit*, Tempe, Arizona, October 4, 2012.

[C7] **Ariane Middel**, Anthony Brazel, Shai Kaplan, Soe Myint, Summer nighttime cooling and cooling efficiency in Phoenix. *14th Annual CAP LTER Poster Symposium*, Tempe, Arizona, January 13, 2012.

[C6] 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.

[C5] 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.

[C4] 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. *13th Annual CAP LTER Poster Symposium*, Tempe, Arizona, January 13, 2011.

[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, Poster presented at *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.

Patents

Karthik Kashinath Kulkarni, Suren Jayasuriya, Ariane Middel, Tejaswi Gowda, Florian A. Schneider. (2023). Biometeorological sensing device with embedded computer vision. US Patent App. 17/962,460

Invited Presentations

09/2023	Urban Tree Canopy to Mitigate Heat <i>Panelist at conference “Urban Forestry: Solutions for a Changing Climate”, September 16, 2023, Hixon Center for Urban Sustainability, Yale University</i>
07/2023	The Heat is On! Heat Exposure Assessment in the Desert Southwest US <i>Seminar, Nanjing University, July 22, 2023</i>
06/2023	The City of Phoenix Cool Pavement Pilot Program <i>Webinar for USDN, June 29, 2023</i>
01/2023	The New Age of Urban Meteorology: How Data is Transforming the Science of Cities <i>Presidential Panel, AMS Conference, Denver, Colorado, January 11, 2023</i>
01/2023	Urban Climate Workshop Part 1 <i>Panelist, AMS Conference, Denver, Colorado, January 11, 2023</i>
09/2022	How geographers (“urban climatologists”) help beat the heat! <i>Invited Presentation and MaRTy demo, University High School in Tolleson, September 12, 2022</i>
09/2022	Urban Climate Informatics – An emerging direction in urban climate research <i>Invited keynote, IAUC Virtual Poster Session, September 1, 2022</i>
07/2022	Advancements in Urban climate: Thermal environment modeling and sensing for heat mitigation <i>Invited Speaker, Virtual Research Seminar, School of Geography and Ocean Science, Nanjing University, July 11, 2022</i>
03/2022	Biometeorological Sensing of Human Thermal Exposure: Meet MaRTy! <i>Denver Urban Field Station (DUFFS) Meeting, March 4, 2022</i>
01/2022	The City of Phoenix cool pavement pilot program <i>Invited Speaker, National Asphalt Pavement Association (NAPA) Annual Meeting, Scottsdale, Arizona, January 24, 2022</i>
12/2021	Biometeorological sensing of human thermal exposure in cities: Meet MaRTy! <i>Invited Speaker, AGU Fall Meeting, Urban Areas and Global Change session, December 15, 2021</i>
11/2021	Arizona heat and the MaRTy project <i>SensMACH Plenary talk, November 9, 2021</i>
11/2021	Sensible heatscapes: Exploring heat mitigation strategies from a pedestrian perspective <i>SGSUP Colloquium, November 1, 2021</i>
09/2021	Phoenix, Arizona: A living laboratory for heat mitigation <i>EBC Climate Change Webinar, September 30, 2021</i>

- 09/2021 **Thermal technologies for heat sensing in built and natural environments**
Invited Speaker, 22nd International Congress of Biometeorology, virtual, September 21, 2021
- 04/2021 **Artificial turf & heat**
Presentation to CEAG Member Municipalities, April 13, 2021
- 04/2021 **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
- 03/2021 **2021 FSE NSF CAREER Workshop**
Panelist, March 26, 2021
- 03/2021 **Urban Heat (Island)**
Presentation for AZ Sustainability Alliance, March 20, 2021
- 02/2021 **Global Heat Health Information Network (GHHIN) Masterclass 5.1 - Understanding urban heat: Urban climate science background**
Webinar presenter (with Edith de Guzman, Matthias Roth, Heinke Schlünzen, Jennifer Vanos), February 17, 2021
- 10/2020 **Human thermal exposure in cities: The role of urban design**
ARCH7130 Research Studio, Northeastern University, Boston
- 10/2020 **Human thermal exposure in cities - Novel sensing and modeling to build heat-resilience**
SCaRP Fall Research Seminar Series, School of City & Regional Planning, GeorgiaTech
- 09/2020 **Heat exposure in the Southwest: Exploring mitigation strategies from a pedestrian perspective**
Presenter at the Climate Adaptation Research Symposium, UCLA Luskin Center for Innovation, September 21, 2020
- 09/2020 **Case critical series: Killer heat in COVID times**
Webinar moderator and presenter (with Juan Declet-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, November 1, 2018
- 09/2018 **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 <i>Invited Speaker, CHAOS Lab, Princeton University, School of Architecture and Andlinger Center for Energy and the Environment, October 18, 2017</i>
09/2017	Urban form and thermal comfort <i>ASU-City of Phoenix (COP) Cooler Phoenix Symposium, City of Phoenix, September 29, 2017</i>
03/2017	Thermal comfort, mean radiant temperature, and shade in hot dry climates <i>5th Jeffrey Cook Workshop on Desert Architecture, Ben-Gurion University of the Negev, Israel, March 8, 2017</i>
02/2017	Beat the heat: Urban climate research to build climate smart cities <i>Department of Geography and Environmental Sustainability, University of Oklahoma, February 27, 2017</i>
05/2016	Impact of urban form and vegetation on microclimate and thermal comfort in hot desert environments <i>Seminar, Nanjing University, China, May 25, 2016</i>
03/2016	How to stay cool in the desert: Urban climate research at the local and microscale <i>Information Science and Technology Seminar Speaker Series, Los Alamos National Lab, March 7, 2016</i>

Teaching

Fall 2023	Introduction to Grand Urban Challenges <i>AME 394, Arizona State University</i>
Spring 2023	Object Oriented Programming and Data Structures <i>CSE 205, Arizona State University</i>
Spring 2023	ThinkFour 7 online video segments recorded
Fall 2022	ThinkFour 4 online video segments recorded
Fall 2022	Sensible Heatscapes <i>AME 494, SOS 494, GPH 494/598, Arizona State University</i>
Spring 2022	Object Oriented Programming and Data Structures <i>CSE 205, Arizona State University</i>
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>
Spring 2020	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, University of Kaiserslautern, Germany</i>

Guest Lectures and Presentations at ASU

11/2023	Extreme Heat: A Grand Urban Challenge <i>EDS 301: Sustainable Community Design and Practices</i>
10/2023	Urban adaptation to Heat <i>SOS 532: Sustainable Urban Dynamics</i>
09/2023	Shade lecture <i>LDE 621: Advanced Landscape Architectural Studio III</i>
09/2023	Meet MaRTy! <i>GPH 413/513: Meteorological Instrumentation</i>
08/2023	Sensing human thermal environments in cities <i>Webinar, AMS monthly climate briefings</i>
04/2023	ASU Open Door <i>Booth with ANDI and MaRTy</i>
04/2023, 11/2023	The UHI and sustainability science: Causes, impacts, and solutions <i>PUP 190/SOS 111: Sustainable Cities</i>
02/2023	Solutions-focused Heat Mitigation in Action <i>SOS 494/598: Healthy Urban Environments</i>
11/2022	Meet MaRTy! <i>GPH 413/513: Meteorological Instrumentation</i>
11/2022	Impact of sustainable design on microclimate and building energy use <i>HIDA Research Showcase, November 16, 2022</i>
11/2022	The UHI and sustainability science: Causes, impacts, and solutions <i>PUP 190/SOS 111: Sustainable Cities</i>

10/2022	Phoenix, Arizona: A Living Laboratory for Heat Research <i>Mirabella Lifelong Learning Signature Lecture Series, October 20, 2022</i>
03/2022	Healthy urban environments: Solutions-focused heat mitigation in action! <i>SOS 494/598: Healthy Urban Environments</i>
11/2021	MaRTy the biometeorological cart <i>GPH 413/513: Meteorological Instrumentation</i>
07/2021	Sensible heatscapes <i>IGD 603 Methods – Research Global Development</i>
11/2020	Novel sensing and modeling to build heat-resilience <i>SenSIP Seminar Series</i>
11/2020	Human thermal exposure in cities <i>Hydrosystems Engineering Seminar Series, School of Sustainable Engineering and the Built Environment</i>
11/2019	Sustainable urban design in hot desert cities <i>SOS 510: Perspectives on Sustainability</i>
10/2019	The Tokyo 2020 Olympic marathons: Spectator thermal comfort and health in the face of extreme heat <i>Faculty Cross Talk: Design and Sports, Global Sports Institute</i>
03/2019	How to stay cool in the desert: Examples of bioclimatic research in Phoenix <i>GPH 213: Climate and Weather</i>
02/2019	Sensible heatscapes <i>Visiting students from PennDesign, University of Pennsylvania</i>
11/2018	Sensible heatscapes – Introduction to the SHADE research lab <i>Digital Culture Speaker Series</i>
10/2018	The UHI and sustainability science: Causes, impacts, and solutions <i>SOS 111: Sustainable Cities</i>
10/2018	Sensible heatscapes – Introduction to the SHADE research lab <i>CEE 591: Environmental Engineering</i>
02/2018 & 11/2017	The UHI and sustainability science: Causes, impacts, and solutions <i>PUP 190/SOS 111: Sustainable Cities</i>
02/2017 & 11/2016	The UHI and sustainability science: Causes, impacts, and solutions <i>PUP 190/SOS 111: Sustainable Cities</i>
09/2016	Impact of urban form, design, and landscaping on microclimate and comfort: Microclimate modeling and field observation studies in Phoenix <i>PUP 442: Environmental Planning</i>
03/2016 & 11/2015	The UHI and sustainability science: Causes, impacts, and solutions <i>PUP 190/SOS 111: Sustainable Cities</i>
10/2015	The hot and cold of it: Environmental research in extreme climates <i>GPH 212: Introduction to Meteorology</i>

09/2015	Urban Heat Island mitigation <i>PUP 598: Environmental Planning</i>
04/2015	Impact of urban form, design, and landscaping on microclimate and comfort: Microclimate modeling and field observation studies <i>PUP 591: Cool Cities</i>
11/2014	Impact of vegetation and urban form on neighborhood microclimate and water use: Examples of modeling and field observation studies in Phoenix <i>GPH 591: Urban Climate</i>
11/2014	Urbanization and the Urban Heat Island (UHI) <i>Guest Lecture, GPH 314: Global Change</i>
10/2014	The UHI and sustainability science: Causes, impacts, and solutions <i>Guest Lecture, PUP 190/SOS 111: Sustainable Cities</i>
04/2014	Planning for cooler cities: Heat mitigation in Phoenix through landscape and urban design <i>Guest Lecture, PUP 591: Cool Cities</i>
04/2013	Planning for cooler cities: Microclimate modeling <i>Guest Lecture, PUP 591: Cool Cities</i>
10/2012	Climate modeling in urban planning <i>Guest Lecture, PUP 571</i>

Mentoring

Current Graduate Advisees (+ = advanced to candidacy)

Pouya Shaeri, Ph.D. 2026, Computer Science, Arizona State University (chair)
 Muhammad Abdullah, Ph.D. 2026, Sustainability, Arizona State University (co-chair)
 Edwin Alejandro Ramirez, Ph.D., 2025, Geography, Arizona State University (committee member)
 Peter Price, Ph.D. 2025, Landscape Architecture, Arizona State University (committee member)
 Zachary Van Tol, Ph.D. 2025, Sustainability, Arizona State University (co-chair)
 Gisel Guzman, Ph.D. 2025, Geography, Arizona State University (co-chair)
 Shri Harri Viswanathan, Ph.D. 2025, Mechanical Engineering, Arizona State University (committee member)
 Ali Alyakoob+, Ph.D. 2024, Sustainable Engineering, Arizona State University (co-chair)
 Matthew Huff, M.S. 2024, Computer Science, Arizona State University (chair)

PhD students graduated

Florian Arwed Schneider, Ph.D. 2023, Sustainability, Arizona State University (chair)
 Mary Wright, Ph.D. 2023, Geography, Arizona State University (committee member)
 Mansoureh Gholami, Ph.D. 2022, Ag Engineering, University of Bologna, Italy (committee member)
 Rui Li, Ph.D. 2022, Sustainable Engineering, Arizona State University (committee member)
 Peter Crank, Ph.D. 2021, Geography, 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)
 Mehdi P. Heris, Ph.D. 2018, Geography, University of Colorado Denver (committee member)
 Yujia Zhang, Ph.D. 2018, Geography, Arizona State University (committee member)

Kathrin Häb, Ph.D. 2015, Computer Science, University of Kaiserslautern (co-chair)

MS students graduated

Maya Muir, M.S. 2023, Computer Science, Arizona State University (co-chair)
Hayley Steiner, MA 2022, Arts, Media and Engineering, Arizona State University (co-chair)
Timothy Aiello, M.Sc. 2022, Environmental Sciences, University of Guelph (committee member)
Karthik Kashinath Kulkarni, M.S. 2021, Computer Engineering, Arizona State University (co-chair)
Dania Tahir Alarfaj, MA, 2020, Interior Architecture, Arizona State 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)
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)
Stephanie Schweitzer, M.S. 2013, Computer Science, University of Kaiserslautern (committee member)

Current Undergraduate Advisees

Charmi Patel, B.S., 2025, Computer Science, Arizona State University (student volunteer)
Fletcher Emmott, B.S., 2027, Computer Science and Barrett, Arizona State University (student volunteer)
Devbrat Hariyani, B.S., 2024, Computer Science, Arizona State University (FURI)
Shrey Garg, B.S., 2024, Computer Science, Arizona State University (thesis chair)

Past Undergraduate Advisees

Huan Doan, B.S., 2023, Computer Science, Arizona State University (student worker)
Erin Epel, B.A. 2023, Barrett Honors College, Arizona State University (internship advisor)
Trevor Johnson, B.S. 2023, Barrett Honors College, Arizona State University (internship advisor)
Neha Balamurugan, B.S. 2024, Computer Science, Arizona State University (student volunteer)
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)

Completed Undergraduate Theses

Trevor Johnson, B.S. 2023, Barrett Honors College, Arizona State University (co-chair)
Maya Muir, B.S. 2022, Computer Science, Arizona State University (co-chair)
Jason Manuel, B.S., 2022, Barrett Honors College, Arizona State University (committee member)
Jacob Lachapelle, B.S., 2021, Environmental Sciences, University of Guelph (committee member)
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

Ryan Woo, B.S. 2025, Computer Science, Arizona State University (REU, 2024)
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

Saud AlKhaled, Assistant Professor, Kuwait University, Kuwait (visiting scholar, 2023–2024)
Hai Yan, Assistant Professor, College of Landscape Architecture, Zhejiang A&F University, China (visiting scholar, 2023–2024)

Milica Pecelj, Assistant Professor, Department of Geography, University of East Sarajevo, Bosnia and Herzegovina (visiting scholar, 2023)

Ahmet Çilek, Assistant Professor, Landscape Architecture, Çukurova Üniversitesi, Turkey (visiting scholar, 2022–2023)

Müge Ünal Çilek, Post-Doctoral Scholar, Landscape Architecture, Çukurova Üniversitesi, Turkey (visiting scholar, 2022–2023)

Shuang Liu, Ph.D. 2023, Landscape Architecture, South China University of Technology (visiting scholar, 2022)

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 Lukasczyk, 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

Computer Science Capstone group “Lenzya”, SCAI (Fall 2023/Spring 2024)

Computer Science Capstone group “Cool Routes”, SCAI (Fall 2022/Spring 2023)

Digital Culture Capstone group “Thermal Threat VR”, AME (Fall 2019)

Digital Culture Capstone group “Mobile Smart Garden”, AME (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”, AME (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

Evan Crabtree, M.S., Computer Science, Arizona State University (08/2023 – present)

Sowmik Sunil, M.S., Robotics, Arizona State University (11/2021 – 05/2023)

Sherly Hartono, B.S., Computer Science, Arizona State University (10/2021 – 12/2021)

Ananth Udupa, B.A., Barrett Honors College, Arizona State University (08/2019 – 12/2021)

Matthew Huff, B.S. 2020, Computer Science, Arizona State University (07/2020 – 12/2020)

Johny J. Cordova, B.S. 2021, Civil Engineering, Arizona State University (08/2020 – 05/2021)

Maddie Potts, B.A. 2022, Barrett Honors College, Arizona State University (08/2020 – 08/2021)

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)

Undergraduate Advisees (for academic credit) & Honors Contracts

Ash Soriano, Honors Contract, Fall 2023

Shrey Garg, HON 498, Fall 2023

Garrett Storey, HON 498, Spring 2022

Sabah Ashfeen, Honors Contract, CSE 205, Fall 2021

Gant Miller, Honors Contract, CSE 205, Fall 2021

Haarika Atluri, Honors Contract, CSE 205, Fall 2021

Fulton Undergraduate Research Initiative (FURI)

Huan Doan, Computer Science, "Urban Climate Data Visualization and Exploration Tool", November 2022

Kayshavi Bakshi, Barrett Honors College, Arizona State University, "Improvement of the MaRTiny: A low cost thermal sensing device", Spring 2022

Maya Muir, Computer Science, "A Decision Support System for Urban Canopy Selection", Arizona State University, Fall 2021, Spring 2022

Student Success

Maya Muir	Outstanding Graduate, Computer Science, Spring 2022
Hayley Steiner	Outstanding Graduate in Entrepreneurship, HIDA, Spring 2022
Florian Schneider	Outstanding SOS Graduate Student, Spring 2023 Dissertation Completion Fellowship (AY 2022/2023) Graduate and Professional Student Association (GPSA) President (AY 2022/2023)
Jacob Lachapelle	AMS Annual Meeting, Oral Presentation Award, January 2020
Ananth Udupa	2020 AAAS Student E-Poster Competition: Honorable Mention in the Environment & Ecology category 2020 UCRC Student E-Poster Competition: 1st place in undergraduate category
Saud AlKhaled	2019 UCRC Annual Poster Competition: 2nd place in graduate student category 2018 UCRC Annual Poster Competition: 1st place in graduate student category
Lolya McWest	2018 UWIN Annual Poster Competition: 2nd place in undergraduate poster category
Samuel Meltzer	2018 UWIN Annual Poster Competition: 1st place in undergraduate poster category

Professional Development

08/2020 – 05/2021	Global Futures Research Accelerator Program helps to further develop knowledge and resources in enterprise research strategy, innovation, and competitiveness
03/2019	Fulton Schools of Engineering NSF CAREER workshop
08/2018 – 05/2019	KEEN New Faculty Teaching Workshop Fulton Schools of Engineering's professional development workshop to support effective teaching and instructional practices

Professional Memberships

2016, 2019 – present	EGU (European Geosciences Union)
2015 – present	ISB (International Society of Biometeorology)
2015 – 2017, 2021	AGU (American Geophysical Union)
2013 – present	AMS (American Meteorological Society)
2012 – present	IAUC (International Association for Urban Climate)

2012 – present	AAG (Association of American Geographers) and Climate Specialty Group
2011 – present	IEEE (Institute of Electrical and Electronics Engineers)
2012 – 2016	APA (American Planning Association)
2001 – present	DVW (German Surveying Association)

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, Geo-spatial Information Science, IEEE Symposium on Visualization, International Journal of Biometeorology, International Journal of Climatology, Israel Science Foundation (ISF), 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, National Science Foundation, 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

2024	Session Chair, Environment and Health, <i>104th AMS Annual Meeting</i> , Baltimore, January 26 – February 1, 2024
2023	Session Co-Chair, Urban sustainability: coupling social-ecological systems to overcome climate and biodiversity crises, <i>International Workshop on Geography and Sustainability 2023 (GEOSUS 2023)</i> , Beijing, China, October 26–29, 2023.
2023	Session Co-Chair, Urban climate methods: Urban climate informatics, <i>11th International Conference for Urban Climate (ICUC-11)</i> , Sydney, Australia, August 28 – September 1, 2023
2023	Local Organizing Committee, International Congress for Biometeorology (ICB), Tempe, Arizona, May 14–17, 2023
2023	Session Chair, Urban environment and Health Impacts I & 2, <i>103rd AMS Annual Meeting</i> , Denver, January 8–12, 2023
2022	Bochum Urban Climate Summer School (BUCSS), Ruhr-Universität Bochum, September 26–29, 2022, Instructor
2022 – 2026	President, International Association for Urban Climate (IAUC)
2022	Session Chair, Heat in the City: Science and Solutions, <i>102nd AMS Annual Meeting</i> , Houston/virtual, January 24–27, 2022
2021 – 2022	IAUC Virtual Poster Conference, August 30 – September 1, 2022, Organizing Committee (Keynote Committee)
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 – 2022	Guest editor, Frontiers Special Topic Collection “Urban Climate informatics”

2020 – present Board member, AMS Built Environment (BUE)

2020 Session Co-Chair, Outcome-Focused Urban Climate Research for Community Resilience, *100th AMS Annual Meeting*, Boston, Massachusetts, January 12–16, 2020

2019 – 2022 Executive Board member (Treasurer), International Association for Urban Climate (IAUC)

2019 Session Co-Chair, Phoenix as a Sandbox for Studying Urban Climate in Arid Regions, *99th AMS Annual Meeting*, Phoenix, Arizona, January 6–10, 2019

2018 Session Chair, Biometeorology IV, *10th International Conference on Urban Climate (ICUC-10)*, 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

Arizona State University Service

2023 – 2024 Assistant Director of Research, Global Futures Laboratory

2023 – 2024 AME/ECEE Faculty Search Committee, AI

2022 – 2023 SCAI Faculty Search Committee, Urban and Social Computing

2022 – 2025 SCAI Undergraduate Program Committee for Computer Science

2021 – 2022 SCAI Working Group on Instructional Innovation

2021 AME Charter Committee

2020 – 2021 AME Director Search Advisory Committee

2019 – 2020 Faculty Search Committee, Architecture

2019, 2020, 2023 Poster Judge, ASU Urban Climate Research Center, Student Poster Competition

2019, 2020 Poster Judge, CAP LTER Annual Poster Symposium

2016 – present Urban Climate Research Center Leadership Team

Public Service

[M157] 12 News (January 2024): Why fake grass is not a good alternative for your lawn
<https://www.12news.com/article/tech/science/environment/artificial-turf-dangerous-pfas/75-8d23c43d-caa4-45c0-9206-ca8c42f9b5ab>

[M156] Cronkite News (October 2023): Phoenix funding trees and shade structures for underserved communities
<https://cronkitenews.azpbs.org/2023/10/12/phoenix-funding-trees-shade-structures-underserved-communities/>

[M155] Arizona State Press Magazine (October 2023): Hot, Hotter, Hottest: How the University is combating Arizona's historic heat
<https://www.statepress.com/article/2023/10/magazine-urban-heat-robot-asu>

[M154] Resources Radio (September 2023): Learning How to Mitigate Heat in Schools
<https://www.resources.org/resources-radio/learning-how-to-mitigate-heat-in-schools-with-v-kelly-turner/>

[M153] Houston Public Media (September 2023): Hot Stops – “It’s like a sweatbox:” Houston bus stops reach dangerous temperatures this summer <https://www.houstonpublicmedia.org/articles/series/hot-stops/2023/09/07/461283/its-like-a-sweatbox-houston-bus-stops-reach-dangerous-temperatures-this-summer/>
<https://www.houstonpublicmedia.org/articles/series/hot-stops/2023/09/21/462996/metro-could-plant-a-tree-at-every-bus-stop-in-houston-but-it-may-be-a-bit-complicated/>

[M152] Daily Bruin (September 2023): Research team with UCLA associate professor, ASU faculty examines shade deserts
<https://dailybruin.com/2023/09/05/research-team-with-ucla-associate-professor-asu-faculty-examines-shade-deserts>

[M151] The Guardian (August 2023): Midnight runners: the athletes up late to beat the scorching heat
<https://www.theguardian.com/sport/2023/aug/30/running-sports-heat-texas-health>

[M150] NPR The Show (August 2023): Phoenix has sealed 100 miles of streets with cool pavement so far
<https://fronterasdesk.org/content/1855378/phoenix-has-sealed-100-miles-streets-cool-pavement-so-far>

[M149] Good Morning America (August 2023): Robots mimic human reactions to extreme heat
<https://abcnews.go.com/GMA/News/video/robots-mimic-human-reactions-extreme-heat-102094500>
<https://www.youtube.com/watch?v=gqox6O3J8bY>

[M148] AZINNO (August 2023): Meet the world's first outdoor, sweating, breathing and walking manikin
<https://www.bizjournals.com/phoenix/inno/stories/partner-content/2023/08/02/first-outdoor-manikin-arizona-state-university.html>

[M147] State Press (August 2023): Phoenix endures historic heatwave, study says blackout would be catastrophic
<https://www.statepress.com/article/2023/08/phoenix-heat-waves-blackouts-risk>

[M146] ABC Australia (August 2023): Phoenix is trying everything to provide relief in America's hottest city, from reflective road paint to IVs on ice
<https://www.abc.net.au/news/2023-08-06/phoenix-offers-solutions-on-how-to-live-in-a-hot-city/102668794>

[M145] Fox Weather (August 2023): Sweating, shivering mannequin aids research on how bodies respond to extreme temperature
<https://www.foxweather.com/weather-news/sweating-robot-arizona-state-university-heat-research-andi>

[M144] Weather Channel (July 2023): Weather Underground LIVE segment on extreme heat

[M143] BNN Newsroom (July 2023): Introducing ANDI: The Mannequin Simulating Human Response to Extreme Temperatures

<https://bnn.network/breaking-news/health/introducing-andi-the-mannequin-simulating-human-response-to-extreme-temperatures/>

[M142] Inside Climate News (July 2023): Phoenix is Enduring its Hottest Month on Record, But Mitigations Could Make the City's Heat Waves Less Unbearable
<https://insideclimatenews.org/news/29072023/phoenix-hottest-month-mitigations/>

[M141] Bild der Wissenschaft (July 2023): Wie sich Städte gegen Hitze rüsten
<https://www.wissenschaft.de/bdwplus/wie-sich-staedte-gegen-hitze-ruesten/> (behind paywall)

[M140] AZ Family (July 2023): Cool Pavement segment

[M139] KJZZ (July 2023): Is it safe to bake cookies inside your car in Phoenix?
<https://kjzz.org/content/1851508/qaz-it-safe-bake-cookies-inside-your-car-phoenix>

[M138] Best of Arizona Innovation | Made In America (July 2023):
<https://www.youtube.com/watch?v=UwqUt8-3B70>

[M137] NPR Here and Now (June 2023): Sweating, shivering, breathing robots teach humans how extreme temperatures affect the body
<https://www.wbur.org/hereandnow/2023/06/27/robots-extreme-temperatures>

[M136] Reuters (June 2023): Meet 'ANDI', the sweating thermal dummy aiding research to solve heat-related illnesses
<https://www.euronews.com/next/2023/06/13/meet-andi-the-sweating-thermal-dummy-aiding-research-to-solve-heat-related-illnesses>

[M135] SupercarBlondie (June 2023): Meet the world's first 'breathing, sweating, and shivering' robot
<https://supercarblondie.com/andi-breathing-sweating-shivering-robot/>

[M134] IOT World (June 2023): Researchers Develop Sweating Robot to Test Extreme Heat Environments
<https://www.iotworldtoday.com/robotics/researchers-develop-sweating-robot-to-test-extreme-heat-environments>

[M133] Tech Times (June 2023): Meet ANDI: This ASU Thermal Manikin Robot Can Breathe, Sweat and Walk Like a Human
<https://www.techtimes.com/articles/292506/20230611/andi-asu-thermal-manikin-robot-breathe-sweat-walk-human.htm>

[M132] Interesting Engineering (June 2023): Meet ANDI: A robot that can breathe, sweat and walk
<https://interestingengineering.com/innovation/meet-andi-a-robot-that-can-breathe-sweat-and-walk>

[M131] LADBible (June 2023): Scientists create world's first 'breathing, sweating, shivering' robot
<https://www.ladbible.com/news/andi-breathing-sweating-shivering-robot-scientists-109119-20230611>

[M130] Giant Freakin Robot (June 2023): Robots Are Being Programmed With The Most Disgusting Human Trait
<https://www.giantfreakinrobot.com/sci/robots-programmed-disgusting-human-trait.html>

[M129] UNILAD (June 2023): First 'breathing, sweating, shivering' robot has been invented by scientists
<https://www.unilad.com/news/doomsday-glacier-trouble-new-study-536644-20230218>

[M128] Daily Mail (June 2023): Scientists create the world's first outdoor walking manikin that sweats, shivers and breathes like a human
<https://www.dailymail.co.uk/sciencetech/article-12174761/First-breathing-sweating-shivering-robot-created-indoor-outdoor-extreme-heat-wave-research.html>

[M127] AZ Family (June 2023): Meet ASU's new research tool: ANDI the thermal manikin
<https://www.azfamily.com/video/2023/06/07/meet-asus-new-research-tool-andi-thermal-manikin/>

[M126] ABC News (June 2023): ASU studying heat in a unique way
https://www.abc15.com/news/local-news/asu-studying-heat-in-a-unique-way?_amp=true

[M125] Slate (May 2023): Meet “La Sombrita,” the Shade Structure That Only Attracts More Heat
<https://slate.com/business/2023/05/la-sombrita-shade-bus-stop-los-angeles-kounkuey-background-history.html>

[M124] ASU News (May 2023): Meet the world's 1st outdoor sweating, breathing and walking manikin
<https://news.asu.edu/20230525-solutions-meet-andi-worlds-first-outdoor-sweating-breathing-and-walking-manikin>

[M123] ASU News (May 2023): ASU grad bridges gap between science, practice
<https://news.asu.edu/20230510-asu-grad-bridges-gap-between-science-practice>

[M122] NOVA (April 2023): Weathering the future, Season 50, Episode 5
<https://www.pbs.org/video/weathering-the-future-kputuw/>

[M121] Parachute (April 2023): What you actually need to know about the cool streets beneath your hot feet
https://open.substack.com/pub/parachuteearth/p/reflective-pavements?utm_source=direct&utm_campaign=post&utm_medium=web

[M120] The Dallas Morning News (November 2022): Street teams, cool pavement, shady trees: How Phoenix protects residents from extreme heat
<https://www.dallasnews.com/news/2022/11/10/street-teams-cool-pavement-shady-trees-how-phoenix-protects-residents-from-extreme-heat/>

[M119] Redshift Autodesk (October 2022): What Is an Urban Heat Island—and What Can Designers Do to Prevent One?
<https://redshift.autodesk.com/articles/what-is-an-urban-heat-island>

[M118] Wbur (October 2022): How pavement can help cool overheated cities, even in chilly Mass.
<https://www.wbur.org/news/2022/10/24/northeast-boston-asphalt-pavement-cooling-strategies>

[M117] ZDFInfo (October 2022) Die neue Heizeit: Zivilisation. Spurensuche in der Vergangenheit (3/3) (Documentary on “Surviving Hothouse Earth” on public German TV)

[M116] ASU News, Full Circle, The Business Journals (October/November 2022): The heat is on: ASU team researches effects of increasing temperatures
<https://news.asu.edu/20221019-solutions-heat-asu-researchers-coping-overexposure-high-temperatures>
<https://fullcircle.asu.edu/research/the-heat-is-on/>
<https://www.bizjournals.com/phoenix/inno/stories/partner-content/2022/11/08/asu-team-researches-effects-of-higher-temperatures.html>

[M115] Women In Academia (WIA) Report (October 2022): Arizona State University’s Ariane Middel Is the New President of the International Association for Urban Climate
<https://www.wiareport.com/2022/10/arizona-state-universitys-ariane-middel-is-the-new-president-of-the-international-association-for-urban-climate/>

[M114] AZ State Press (October 2022): The shade shortage: ASU's efforts and struggles to shield students in the Valley of the Sun
<https://www.statepress.com/article/2022/10/shade-shortage-asu-tempe-heat>

[M113] WIRED (September 2022): Lawns Are Dumb. But Ripping Them Out May Come With a Catch
<https://www.wired.com/story/lawns-are-dumb-but-ripping-them-out-may-come-with-a-catch/>

[M112] ASU News (September 2022): ASU professor chosen to lead global urban climate research organization
<https://news.asu.edu/20220915-university-news-asu-professor-chosen-lead-global-urban-climate-research-organization>

[M111] UCLA (August 2022): Heat waves aren't going away. Here's how we can prepare
<https://www.universityofcalifornia.edu/news/heat-waves-arent-going-away-heres-how-we-can-prepare>
<https://www.youtube.com/watch?v=rJ1T4csKaDA>

[M110] KJZZ (August 2022): Q&AZ: Does gravel landscape negatively impact the urban heat island effect in Arizona?
<https://kjzz.org/content/1800713/qaz-does-gravel-landscape-negatively-impact-urban-heat-island-effect-arizona>

[M109] CNN (August 2022): These cities are better at enduring extreme heat. Here's what they're doing different
<https://www.cnn.com/2022/08/04/world/cool-cities-heat-wave-climate-cmd-intl/index.html>

[M108] NPR All Things Considered (May 2022): A block in Massachusetts is the test site for ways to cool cities in the summer
<https://www.npr.org/2022/05/24/1101040221/a-block-in-massachusetts-is-the-test-site-for-ways-to-cool-cities-in-the-summer>

[M107] NPR (May 2022): In Chelsea, cooling an urban heat island one block at a time
<https://www.wbur.org/news/2022/05/12/chelsea-massachusetts-heat-island-cooling>

[M106] American Innovators (April 2022): How America's Hottest City is Handling the Heat
<https://www.youtube.com/watch?v=hrDHPYmJJ-A>

[M105] ABC News (April 2022): Artificial turf saves water, but heats considerably in direct sunlight
<https://www.abc15.com/weather/impact-earth/artificial-turf-saves-water-but-heats-considerably-in-direct-sunlight>

[M104] Phoenix Newsroom (March 2022): Cool pavement program honored by Arizona Forward
<https://www.phoenix.gov/newsroom/street-transportation/2278>

[M103] Phoenix Newsroom (March 2022): Cool Pavement Program Earns Innovative Transportation Solutions Award
<https://www.phoenix.gov/newsroom/street-transportation/2268>

[M102] Crossing City Limits Podcast (February 2022): Urban shade/Phoenix
<https://crossingcitylimits.com/podcast/02-ariane-middel-phd-urban-shade-phoenix>

[M101] Earth Stories | Mutant Weather (January 2022): Mutant Heat
<https://www.youtube.com/watch?v=9spGIL5S1RM>

[M100] Voices of America Tek (January 2022): Urban Heat Island
<https://vimeo.com/659065171>
<https://ir.voanews.com/a/6379877.html>

[M99] GEO (January 2022): Phoenix, métropole la plus chaude des Etats-Unis et laboratoire du changement climatique
<https://www.geo.fr/geopolitique/phoenix-metropole-la-plus-chaude-des-etats-unis-et-laboratoire-du-changement-climatique-207328>

[M98] GEO (December 2021): Ce monde qui change: Phoenix, la métropole la plus chaude des États-Unis.
<https://photo.geo.fr/arizona-enquete-a-phoenix-ville-en-surchauffe-47245#l-ete-des-le-printemps-cvmbh>

[M97] The Denver Channel (December 2021): Fighting climate change: Not all trees are created equal
<https://www.thedenverchannel.com/news/national/fighting-climate-change-not-all-trees-are-created-equal>

[M96] The Verge (November 2021): Democrats' plan to boost 'tree equity' is actually a good idea
<https://www.theverge.com/2021/11/24/22801103/build-back-better-act-democrats-tree-equity-budget-reconciliation-bill>

[M95] Cronkite News (October 2021): Silent storm: Extreme heat prompts new national guidelines for workers
<https://cronkitenews.azpbs.org/2021/10/14/arizona-weather-extreme-heat-new-national-guidelines-for-workers/>

[M94] Phoenix Business Journal (October 2021): Increasing days with extreme heat prompt new US guidelines for workers
https://www.bizjournals.com/phoenix/news/2021/10/29/extreme-heat-prompts-national-worker-guidelines.html?ana=e_phx_bn_editorschoice_editorschoice

[M93] The State Press (October 2021): A new kind of MaRTiny: ASU researchers hope device will help gather heat data
<https://www.statepress.com/article/2021/10/new-device-developed-by-asu-measures-heat-effect>

[M92] Scientific American (October 2021): To Beat the Heat, Phoenix Paints Its Streets Gray
<https://www.scientificamerican.com/article/to-beat-the-heat-phoenix-paints-its-streets-gray/>

[M91] M6 (September 2021): Etats-Unis: la chaleur au zénith à Phoenix
<https://www.facebook.com/watch/?v=561663291588465>

[M90] Fox10 (September 2021): Phoenix's 'cool pavement' technology coming to 9 neighborhoods
<https://www.fox10phoenix.com/news/effectiveness-of-phoenixs-cool-pavement-technology-to-be-announced-after-year-project?fbclid=IwAR1oJYrEBv4w5DSUm6iKH2GZaxPDQ-YuwgjVkkbNn5dy-5x4t3UYdRISYx0>

[M89] ASU Now (September 2021): Trying to cool off neighborhoods with a new kind of road surface
<https://news.asu.edu/20210921-arizona-impact-phoenix-coolseal-pavement-heat-study>

[M88] Vox (September 2021): How America's hottest city is trying to cool down
<https://www.vox.com/videos/2021/9/20/22683888/sonoran-desert-phoenix-tree-equity>
<https://www.youtube.com/watch?v=ZQ6fSHr5TJg>

[M87] AZ Big Media (September): Here's how cool pavement pilot program is impacting Phoenix
<https://azbigmedia.com/business/heres-how-cool-pavement-pilot-program-is-impacting-phoenix/>

[M86] ABC News (August 2021): ASU shade research could help guide urban heat island mitigation strategies
<https://www.abc15.com/weather/impact-earth/asu-shade-research-could-help-guide-urban-heat-island-mitigation-strategies>

[M85] ASU Now (August 2021): Staying cool for back to school
<https://news.asu.edu/20210819-discoveries-staying-cool-back-school>

[M84] NowThis (July 2021): This is how urban heat impacts communities of color
https://www.youtube.com/watch?app=desktop&v=E6WI_RWNrCU

- [M83] Phoenix Magazine (July 2021): The Bitcoin Industry's Environmental Impact
<https://www.phoenixmag.com/2021/07/14/the-bitcoin-industrys-environmental-impacts/>
- [M82] Euronews (July 2021): Living in a heatwave: How to design the climate-proof cities of tomorrow
<https://www.euronews.com/next/2021/07/13/living-in-a-heatwave-how-to-design-the-climate-proof-cities-of-tomorrow>
- [M81] Phoenix New Times (July 2021): No Shade: Why Is It So Hard to Hide From the Sun in Phoenix?
<https://www.phoenixnewtimes.com/news/phoenix-shade-ariane-middel-asu-salt-river-elizabeth-makings-trees-11575994>
- [M80] National Geographic (July 2021): Too hot to live: Millions worldwide will face unbearable temperatures
<https://www.nationalgeographic.com/magazine/article/too-hot-to-live-millions-worldwide-will-face-unbearable-temperatures-feature>
- [M79] NPR The Show (June 2021): New Research: Some Types Of Shade Better Than Others At Keeping Us Cool
<https://theshow.kjzz.org/content/1691840/new-research-some-types-shade-better-others-keeping-us-cool>
- [M78] PBS Terra (June 2021): Weathered: How America's Hottest City is Innovating to Survive
<https://www.youtube.com/watch?v=Q2RQjtucG3M>
- [M77] ASU Now (June 2021): Do trees provide the best shade for urban environments?
<https://news.asu.edu/20210603-discoveries-asu-researchers-measure-comfort-power-different-kinds-city-shade>
- [M76] ClimateOne Podcast (May 2021): Hot Cities, Methane Leakers and the Catholic Church
<https://www.climateone.org/audio/hot-cities-methane-leakers-and-catholic-church>
- [M75] ABC News (May 2021): Climate change and urban development leading to warmer nights in Phoenix
<https://www.abc15.com/weather/impact-earth/phoenixs-urban-development-is-making-an-already-hot-desert-even-warmer>
- [M74] 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>
- [M73] 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>
- [M72] 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
- [M71] Tuscon Sentinel (October 2020): Arizona will have more 'extreme heat' days, researchers say
http://www.tucsonsentinel.com/local/report/101220_az_heat_predictions/arizona-will-have-more-extreme-heat-days-researchers-say/
- [M70] High Country News (September 2020): Extreme heat is here, and it's deadly
<https://www.hcn.org/issues/52.9/south-climate-change-extreme-heat-is-here-and-its-deadly>
- [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
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