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Research Applications Laboratory  
National Center for Atmospheric Research  
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### **Professional Preparation**

<b>University of Kiel, Germany</b>	<b>B.A. equiv. 1977</b>	<b>Islamic Studies</b>
<b>Metropolitan State College, Denver</b>	<b>B.A. 1984</b>	<b>German; Meteorology</b>
<b>University of Colorado, Boulder</b>	<b>M.A. 1992</b>	<b>Geography (Climatology)</b>
<b>University of Colorado, Denver</b>	<b>Ph.D. 2003</b>	<b>Health and Behavioral Sciences</b>

### **Appointments**

2012-present	<b>Scientist II</b> , Research Applications Laboratory, National Center for Atmospheric Research (NCAR)
2009 - 2012	<b>Scientist I</b> , Research Applications Laboratory, National Center for Atmospheric Research (NCAR)
2010 - present	<b>Adjunct Assistant Professor</b> , University of Colorado School of Public Health
2006 – present	<b>Center Affiliate</b> , University of Colorado, Trauma, Health and Hazards Center
2007 - present	<b>Guest Researcher</b> , Division of Vector-Borne Infectious Diseases, Centers for Disease Control and Prevention, Fort Collins, CO
2006 - 2009	<b>Postdoctoral Fellow/Visiting Scientist</b> , Institute for the Study of Society and Environment, NCAR
2003 –2006	Postdoctoral Fellow, University of Colorado, CU Trauma, Health and Hazards Center, Colorado Springs, CO
2003 – 2005	Senior Research Associate, University of Colorado, Health and Behavioral Sciences
1999 - 2003	Chair, Department of Geography, Geology, and Astronomy; Pikes Peak Community College, Colorado Springs, CO
1996 - 2003	Faculty, Department of Geography, Pikes Peak Community College, Colorado Springs, CO
1996 - 1999	Adjunct Assistant Professor, Department of Geography and Environmental Studies, University of Colorado, Colorado Springs, CO

### **Peer-reviewed Publications**

Spiegel J, Bennett S, Hattersley L, **Hayden MH**, Kittayapong P, Nalim S, Wang D, Zielinski-Gutierrez E, and Gubler D. (2005). Barriers and bridges to prevention and control of dengue: the need for a social-ecological approach. *EcoHealth* 2 (4): 273-290

Zielinski-Gutierrez EC and **Hayden MH**. (2006) A model for defining West Nile virus risk perception based on ecology and proximity. *EcoHealth* 3(1): 28-34

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Moreno R, **Hayden MH**, Janes C, and Anderson G. (2006). A web-based multimedia spatial information system to document *Aedes aegypti* breeding sites and dengue fever risk along the US-Mexico border. *Health and Place* 12(4):715-27

Barnes LR, Grunfest EC, **Hayden MH**, Schultz DM and Benight, C. (2007) False Alarms and Close Calls: A Conceptual Model of Warning Accuracy. *Weather and Forecasting*, 22(5):1140-1147

Moreno-Sanchez R, Anderson G, Cruz J and **Hayden MH** (2007) The potential for the use of Open Source Software and Open Specifications in creating web-based cross-border health spatial information systems. *The International Journal of Geographical Information Science* 21(10): 1135-1163.

**Hayden MH**, Drobot S, Radil S, Benight C, Grunfest EC and Barnes LR. (2007) Information Sources for Flash Flood Warnings in Denver, CO and Austin, TX. *Environmental Hazards* 7(3): 211-219

Benight C, Grunfest E, **Hayden MH**, Drobot S. (2007) Trauma and Short-Fuse Weather Warning Perceptions. *Environmental Hazards* 7(3): 220-226

Ramos M, Mohammad H, Zielinski-Gutierrez E, **Hayden MH**, Robles Lopez JL, Fournier M, Rodríguez Trujillo A, Burton R, Brunkard J, Anaya-Lopez L, Abell A, Kuri-Morales P, Smith B, Munoz J, Waterman S, and the Dengue Serosurvey Working Group. (2008) Epidemic Dengue and Dengue Hemorrhagic Fever at the Texas-Mexico Border: Results of a household-based seroepidemiological survey, December 2005. *American Journal of Tropical Medicine and Hygiene* 78(3): 364-369

Barnes LR, Schultz DM, Grunfest EC, **Hayden MH**, Benight CC (2009) Corrigendum: False Alarm Rate or False Alarm Ratio? *Weather and Forecasting* (in press)

**Hayden MH**, Uejio C, Walker K, Ramberg F, Moreno-Sanchez R, Rosales C, Gameros M, Mearns LO, Zielinski-Gutierrez E and Janes CR. (2010) Microclimate and Human Ecological Factors in the Divergent Ecology of *Aedes aegypti* along the Arizona, U.S./Sonora, MX Border. *EcoHealth* 7 (1): 64-77. doi: 0.1007/s10393-010-0288-z

Wilhelmi OV and **Hayden MH**. (2010) Connecting people and place: a new framework for reducing urban vulnerability to extreme heat. *Environ. Res. Lett.* **5** 014021. doi: 10.1088/1748-9326/5/1/014021

Schultz DM, Grunfest EC, **Hayden MH**, Benight CC, Drobot S and Barnes LR. (2010) Decision Making by Austin, Texas Residents in Hypothetical Tornado Scenarios. *Weather, Climate and Society*. 2(3): 247-252

Morss RE and **Hayden MH**. (2010) Storm surge and “certain death”: Interviews with Texas coastal residents following Hurricane Ike. *Weather, Climate and Society* 2(3):172-187

**Hayden MH**, Brenkert-Smith H., Wilhelmi O. (2011) Differential adaptive capacity to extreme heat: A Phoenix, AZ. case study. *Weather, Climate and Society* 3(4): 269-280.

Dukic V and **Hayden MH**, Forgor-Adams, A, Hopson T, Akweongo, P, Hodgson, A, Monaghan, A. Weidinmyer, C, Yoksas, T, Thomson, M, Tratska, S and R. Pandya. (2012) The role of weather in meningitis outbreaks in Navrongo, Ghana: A Generalized Additive Modeling approach. *Journal of Agricultural, Biological and Environmental Statistics* 17(3): 442-460

Monaghan, A.J., K. MacMillan, S.M. Moore, P.S. Mead, **M.H. Hayden**, and R.J. Eisen, (2012) A regional climatology of West Nile, Uganda, to support human plague modeling. *J. Appl. Meteor. Climatol.*, 51:1201-1221

Lozano-Fuentes S, **Hayden MH**, Welsh-Rodriguez C, Ochoa-Martinez C, Tapia-Santos B, Kobylinski KC, Uejio CK, Zielinski-Gutierrez E, Delle Monache L, Monaghan AJ, Steinhoff DF, and Lars Eisen. (2012) The Dengue Virus Mosquito Vector *Aedes aegypti* at High Elevation in México. *American Journal of Tropical Medicine and Hygiene* 87:902-909 doi: 10.4269/ajtmh.2012.12-0244

Lozano-Fuentes S, Welsh-Rodriguez C, **Hayden MH**, Tapia-Santos B, Ochoa-Martinez C, Kobylinski KC, Uejio CK, Zielinski-Gutierrez E, Delle Monache L, Monaghan AJ, Steinhoff DF, and Lars Eisen. (2012) *Aedes (Ochlerotatus) epactius* Dyar & Knab along an elevation and climate gradient in Veracruz and Puebla States, México. *Journal of Medical Entomology* 10:1244-1253

**Hayden MH**, Dalaba M, Akweongo P, Awine T, Nyaaba G, Anaseba D, Pelzman J, Hodgson A, and Pandya R. (2013) Knowledge, Attitudes and Practices Related to Meningitis in Northern Ghana. *American Journal of Tropical Medicine and Hygiene* 89:265-270.

de Sherbinin, A., Wilhelmi, O and **Hayden, M.** (2013) Exposure to Heat Stress in Urban Environments: Current Status and Future Prospects in a Changing Climate. In: *Ecologies and Politics of Health*, edited by Brian King and Kelley Crews, Routledge Press Chapter 12:219-238.

Akweongo P, Dalaba MA, **Hayden MH**, Awine T, Nyaaba GN, Anaseba D, Hodgson A and Pandya, R. (2013) The economic burden of Meningitis to households in the Kassena-Nankana District of Northern Ghana. *PLOS ONE*  
<http://dx.plos.org/10.1371/journal.pone.0079880>

Abdussalam, A.F., A.J. Monaghan, V.M. Dukic, **M.H. Hayden**, T.M. Hopson, and G.C. Leckebusch, and J. Thornes. Climate influences on the interannual variability of meningitis incidence in northwest Nigeria. (2014) *Wea. Clim. Soc.*, 6, 62-76.  
DOI:10.1175/WCAS-D-13-00004.1.

Heaton, M.J., S.R. Sain, T.A. Greasby, C.K. Uejio, **M.H. Hayden**, A.J. Monaghan, J. Boehnert, K. Sampson, D. Banerjee, V. Nepal, and O.V. Wilhelmi. (2014) Identifying

Vulnerability to Heat-2 Related Mortality using a Spatially Varying Coefficient Model. *Spatio-temporal Epidemiology*, 8:23-33.

Jancloes M, Thomson M, Manez M, Hewitt C, Corvalan C, Dinku T, Lowe R and **Hayden M**. (2014) Climate Services to Improve Public Health. *Int. J. Environ. Res. Public Health*, 11(5), 4555-4559; doi:[10.3390/ijerph110504555](https://doi.org/10.3390/ijerph110504555)

Abdussalam, A.F., A.J. Monaghan, D.H. Steinhoff, V.M. Dukic, **M.H. Hayden**, T.M. Hopson, and J. Thornes, and G.C. Leckebusch. (2014) The impact of climate change on meningitis in northwest Nigeria: an assessment using CMIP5 climate model simulations. *Wea. Clim. Soc.*, accepted for publication.

Lozano-Fuentes, S., C. Welsh-Rodriguez, A.J. Monaghan, D.F. Steinhoff, C. Ochoa-Martinez, B. Tapia Santos, **M.H. Hayden**, and L. Eisen. (2014) Intra\_Annual Changes in Abundance of *Aedes (Stegomyia) aegypti* and *Aedes (Ochlerotatus) epactius* in High-Elevation Communities in México. *J. Med. Entomol.*, accepted for publication

Uejio CK, **Hayden MH**, Zielinski-Gutierrez E, Robles Lopez JL, Barrera R, Amador M, Thompson G, and Waterman SH. (2014) Biological Control of Mosquitoes in Scrap Tires in Brownsville, TX US and Matamoros, TM MX. *Journal of American Mosquito Control Association*, 30 (2), 130-135

Moreno-Madriñán M, Crosson W, Eisen L, Estes S, Estes Jr. M, **Hayden M**, Hemmings S, Irwin D, Lozano-Fuentes S, Monaghan A, Quattrochi D, Welsh-Rodriguez C, Zielinski-Gutierrez E. (2014) Correlating Remote Sensing Data with Abundance of Pupae of the Dengue Virus Mosquito Vector, *Aedes aegypti*, in Central Mexico. *Int. J. Geo-Inf*, 3(2), 732-749

Eisen L, Monaghan A, Lozano-Fuentes S, Steinhoff D, **Hayden M** and Bieringer P. (2014) The Impact of Temperature on the Bionomics of *Aedes (Stegomyia) aegypti*, With Special Reference to the Cool Geographic Range Margins. *J Med Entomol* 51 (3): 496-516

Pandya R, Hodgson A, **Hayden M**, Akweongo P, Hopson T, Adams Forgor A, Yoksas T, Dalaba M, Dukic V, Mera R, Dumont A, McCormack K, Anaseba D, Awine T, Boehnert J, Nyaaba G, Laing A, Semazzi F. (2014) Using Weather Forecasts to Help Manage Meningitis. *Bull. Amer. Meteor. Society* 96(1):103-115

Heaton MJ, Sain SR, Monaghan AJ, Wilhelmi OJ and **Hayden MH**,. (2014) Analyzing an Incomplete Marked Point Pattern of Heat-Related 911 Calls. *Journal of the American Statistical Association*. 110:509, 123-135.

Ernst KC, Haenchen S, Dickinson K, Doyle MS, Walker K, Monaghan AJ, **Hayden MH**. Awareness and support of release of genetically modified “sterile” mosquitoes, Key West, Florida, USA. *Emerg Infect Dis*. 2015 Feb [date cited].  
<http://dx.doi.org/10.3201/eid2102.141035>

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**Hayden MH**, Cavanaugh JL, Tittel C, Butterworth M, Haenchen S, Dickinson K, Monaghan A and Ernst KC. (2015) Post Outbreak Review: Dengue Preparedness and Response in Key West, Florida. *Am J Trop Med Hyg*, accepted for publication.

Dickinson, K.L., E. Kanyomse, R. Piedrahita, E. Coffey, I. Rivera, J. Adoctor, R. Aligiria, D. Muvandimwe, M. Dove, V. Dukic, **M. Hayden**, D. Diaz-Sanchez, V. Adoctor, D. Anaseba, Y. Slichter, N. Masson, A. Monaghan, A. Titati, D. Steinhoff, Y-Y. Hsu, R. Kaspar, B. Brooks, A. Hodgson, M. Hannigan, A. R. Oduro, and C. Wiedinmyer. (2015) Research on Emissions, Air quality, Climate, and Cooking Technologies in Northern Ghana (REACCTING): Study Rationale and Protocol. *BMC Public Health*. Accepted for publication

**Hayden MH**, Monaghan AJ, Apangu T, Griffith KS, Mead PS, Beard CB, BorchertJN, Boegler K, Zielniski-Gitierrez E, Acayo S, Acidri R, Moore SM, MacMillan K, Atiku LA, Mpanga JT, Ensore RE, Gage KL and Eisen RJ. (2015). Mapping and modeling plague in Uganda to improve health outcomes. *WHO-WMO Climate Services for Health*, accepted for publication

Arellano C, Castro L, Diaz R, Ernst K, **Hayden M**, Reyes-Castro P. (2105) Knowledge and beliefs about dengue transmission and their relationship with prevention practices in Hermosillo, Sonora, Mexico: A qualitative assessment. *Frontiers in Public Health*. accepted for publication

Hahn MB, Monaghan AJ, **Hayden MH**, Eisen RJ, Delorey MJ, Lindsey NP, Nasci RS, and M Fischer. (2015) Meteorological conditions associated with increased incidence of West Nile virus disease in the United States, 2004-2012. *Am J Trop Med Hyg*, in press

### **Non-refereed Publications**

Morbidity and Mortality Weekly Report. Dengue Hemorrhagic Fever - U.S. - Mexico Border, 2005. Centers for Disease Control and Prevention. August 10, 2007 56(31);785-789

### **Scientific Presentations**

**Hayden M. Rotary International Annual Meeting** Invited. Keystone, CO. April 2105. “Collaboration with Traditional Healers to Enhance Surveillance for Plague in NW Uganda”.

**Hayden M. Colorado State University.** Invited. Fort Collins, CO. April 2015. “Collaboration with Traditional Healers to Enhance Surveillance for Plague in NW Uganda”.

**Hayden, M. University of Colorado School of Public Health.** Invited. Denver, Colorado. April 2015. “A Tale of Three Cities: Factors Related to Dengue Transmission in Different Ecological Settings”.

**Hayden, M and Wilhelmi O. University of Colorado at Denver. Department of Geography.** Invited. Denver, Colorado. March 2015. “Weather, Climate and Health Research at NCAR”

**Hayden M. Florida State University. Department of Geography.** Invited. Tallahassee, FL September 2014. “Enhancing Surveillance for Plague in NW Uganda.”

**Hayden M. University of Colorado. Department of Health and Behavioral Sciences.** Invited. Denver, CO. September 2014. “Weather, Climate and Health Research at NCAR.”

**Hayden M. University of Colorado School of Public Health.** Invited. Denver, CO. May 2014. “Weather, Climate and Health Research at NCAR.”

**Hayden M. University of Colorado School of Public Health.** Invited. Denver, CO. April 2014. “Weather and Climate Related Health Impacts.”

**Hayden, M and Wilhelmi O. University of Colorado at Denver. Department of Geography.** Invited. Denver, CO. March 2014. “Knowledge Integration at the Science-Policy Interface”.

**Hayden M. Ministerio de Salud Publica.** Invited. Quito, Ecuador. March 2014. “Weather, Climate and Health Research at the National Center for Atmospheric Research”.

**Hayden M. Instituto Nacional de Meteorologia e Hidrologia (INAMHI).** Invited. Guayaquil, Ecuador. March 2014. “Weather, Climate and Health Research at the Science-Policy Interface at NCAR”.

**Hayden M. Pontificia Universidad Catolica Ecuador (PUCE).** Invited. Quito, Ecuador. March 2014. “Weather, Climate and Health Research at the National Center for Atmospheric Research”.

**Hayden M. San Antonio Environmental Challenges: Opportunities in Resilience.** Invited. San Antonio, TX February 2014. “Reducing urban vulnerability to extreme heat: an integrated approach”.

**Hayden M. Mosquito and Vector Control Association of California.** Invited. San Diego, CA February 2014. “A Tale of Two Cities: Comparing Social and Behavioral Factors Related to Dengue Transmission: One With and One Without Recent Transmission”.

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**Hayden M. NOAA Science on a Sphere webinar.** Invited. Boulder, CO. December 2013. “The dengue fever mosquito, *Ae. aegypti*, at high altitudes in Mexico”.

**Hayden M. International Conference on Climate Services 3.** Invited. Montego Bay, Jamaica, December 2013. “An Integrated Approach to Understanding Knowledge, Attitudes and Practices Surrounding Dengue in Emergent and Endemic Areas”.

**Hayden M. National Center for Atmospheric Research Adaptation Day.** Boulder, CO, November 2013. “The dengue vector mosquito *Aedes aegypti* at the margins: sensitivity of a coupled natural and human system to climate change”.

**Hayden M. American Society of Tropical Medicine and Hygiene** annual meeting. Washington, D.C. November 2013. Peer-reviewed poster presentation. “Improving understanding and surveillance of human plague in northern Uganda through modeling and collaboration with traditional healers”.

**Hayden M and Monaghan A. American Society of Tropical Medicine and Hygiene** annual meeting. Invited. Washington, D.C. November 2013. Symposium chairs. “Changing the Climate III: Predicting and Preventing Weather and Climate-sensitive Disease Transmission through Transformative Research”.

**Hayden, M. NASA GPM workshop.** Invited. Greenbelt, MD. November 2013. Panelist on Ecological Forecasting and Public Health. “The Weather, Climate and Health Program at NCAR: Using NASA Products for Public Health Applications”.

**Hayden M. American Public Health Association 141<sup>st</sup> annual meeting.** Invited. Boston, MA. November 2013. “The dengue vector mosquito *Aedes aegypti* at the margins: sensitivity of a coupled natural and human system to climate change”.

**Hayden M. Kenya Medical Research Institute.** Invited. Kisumu, Kenya. June 2013. “Weather, Climate and Health Research at the National Center for Atmospheric Research”.

**Hayden M. IAI Colloquium.** Quito, Ecuador. April 2013. Invited. “Understanding stakeholder knowledge, attitudes and practices surrounding mosquito control and dengue in emergent areas in the southern United States: a case study from Key West, FL”

**Hayden M. University of Colorado at Boulder.** Invited. Boulder, CO April 2013. Collaboration with Traditional Healers to Enhance Surveillance for Plague in NW Uganda”.

**Hayden M. Society for Applied Anthropology.** Invited. Denver, CO. March 2013. “Enhancing Surveillance for Plague in Northwest Uganda”.

**Hayden, M and Wilhelmi O. University of Colorado at Denver.** Invited. Denver, CO. March 2013. “Knowledge Integration at the Science-Policy Interface”.

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**Hayden M, Monaghan A, Wilhelmi O. Forum on the Integration of Climate Science and Infectious Disease.** Invited. Yale University, New Haven, CT. Jan. 2013. “Weather, Climate and Health Research at the National Center for Atmospheric Research”.

**Hayden M. AMS annual meeting.** Invited. Austin, TX. January 2013. “Enhancing Surveillance for Plague in Northwestern Uganda”.

**Hayden, M. IAI Colloquium.** Invited. Santo Domingo, Dominican Republic. November 2012. “Critical Issues and Challenges in Integrated Assessments”.

**Hayden, M. IAI Colloquium.** Invited. Santo Domingo, Dominican Republic. November 2012. “Knowledge Integration in Climate and Health: Enhancing Surveillance for Plague in NW Uganda”.

**Hayden M. Science on Tap.** Colorado Springs, CO. Sept. 2012. “Weather and Witchdoctors: Enhancing Surveillance for Plague in NW Uganda.”

**Hayden M. Emory University.** Atlanta, GA. Sept. 2012. Invited. “Weather and Climate Related Health Impacts.”

**Hayden M. NCAR TOY workshop - Uncertainty in Climate Change Research: An Integrated Approach.** Boulder, CO. August 2012. “Challenges in Addressing Weather and Climate Sensitive Health Impacts”.

**Hayden M, Monaghan A, and Wilhemi O. Colorado State University School of Public Health.** Fort Collins, CO. April 2012. Invited. “Weather, climate and health research at the National Center for Atmospheric Research”.

**Hayden, M and Monaghan, A. Universidad Veracruzana – NASA workshop.** Invited. Xalapa, MX. March 2012. “The dengue vector mosquito *Aedes aegypti* at the margins: sensitivity of a coupled natural and human system to climate change”

**Hayden M. and Wilhelmi, O. University of Colorado at Denver.** Invited. Denver, CO. February 2012. “Weather related linkages to climate and health”.

**Hayden M. Universidad de San Francisco.** Quito, Ecuador. February 2012. Invited. “Weather, climate and health research at the National Center for Atmospheric Research”.

**Hayden, M. National Academy of Sciences Panel on Assessing the Impact of Climate Change on Political and Social Stresses.** Washington, DC. January 2012. Invited. “The dengue vector mosquito *Aedes aegypti* at the margins: sensitivity of a coupled natural and human system to climate change”.

**Hayden, M. American Meteorological Society.** Invited. New Orleans, LA. January 2012. “A socio-economic study of the impact of meningitis in northern Ghana”.

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**Hayden, M. American Society of Tropical Medicine and Hygiene.** Invited. Philadelphia, PA. December 2011. “Investigating the Potential Range Expansion of the Vector Mosquito *Aedes aegypti* in Mexico with NASA Earth Science Remote Sensing Results”.

**Hayden, M. American Society of Tropical Medicine and Hygiene.** Invited. Philadelphia, PA. December 2011. Symposium chair. “Changing the Climate: Predicting and Preventing Disease Transmission through Translational Research”.

**Hayden M, Monaghan A, and Wilhemi O. University of Arizona School of Public Health.** Tucson, AZ. October, 13, 2011. Invited. “Weather, Climate and Human Health”.

**Hayden M. and Zielinski-Gutierrez E. Climate and Health Workshop.** NCAR, Boulder, CO. July 2011. “Health communication and risk perception under (potentially) changing vector-borne disease scenarios”.

**Hayden, M. Wilhelmi O, and Boehnert, J. Haskell Indian Nations University.** Lawrence, KS. June 2011. “Introduction to Climate Change: Qualitative and Quantitative Research Methods for Assessing Population Vulnerability”.

**Hayden M, Monaghan A, and Wilhemi O. Colorado State University.** Fort Collins, CO. April 20, 2011. Invited. “Weather, Climate and Human Health”.

**Hayden M and Wilhelmi O. University of Colorado at Denver.** Denver, CO. March 14, 2011. Invited. “Risk and vulnerability assessments: Knowledge integration from physical and social sciences”.

**Hayden M and Morss R. American Meteorological Society.** Seattle, WA. January 25, 2011. Invited. “Storm Surge and “Certain Death”.

**Hayden M, Pandya R, Hopson T, and Dukic V. MERIT meeting.** Addis Ababa, Ethiopia. November 18, 2010. Invited. “The Weather-Meningitis Project”.

**Hayden M. American Public Health Association.** Denver, CO. November 9, 2010. Invited. “Weather, Climate and Dengue at the U.S.-Mexico Border”.

**Hayden M. NASA Public Health Program Review – Partner Address.** San Antonio, Texas. September 28, 2010. Invited Keynote speaker. “Weather, Climate and Health: Integrating Physical and Social Science”.

**Hayden M. Joint Center for Political and Economic Studies.** Washington, DC. July 27, 2010. Invited Keynote Speaker. “Climate Change, Human Health and the Well-Being of Vulnerable Communities”.

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**Hayden M** and **Wilhelmi O. Maricopa County Department of Health.** Phoenix, AZ. May 12, 2010. “Assessment of local level vulnerability and adaptive capacity to extreme heat.”

**Hayden M** and **Wilhelmi O. University of Colorado.** Denver, CO. May 5, 2010. “Risk and vulnerability assessments: Knowledge integration from physical and social sciences”.

**Hayden M** and **Wilhelmi O. IAI-NCAR Colloquium - Science-Policy Interface: challenges and opportunities.** San Jose, Costa Rica. April 12-22, 2010. “Risk and vulnerability assessments: Knowledge integration from physical and social sciences”.

**Hayden M. NASA.** Huntsville, Alabama. March 15, 2010. “Weather, Climate and Health”.

**Hayden M** and **Thomas, W. American Meteorological Society.** Atlanta, GA. January 18-22, 2010. Co-chair: 1<sup>st</sup> Environment and Health Symposium.

**Hayden M.** and **Zielinski-Gutierrez E. American Society of Tropical Medicine and Hygiene.** Washington, D.C. November 19, 2009. Symposium chair. “Changing the climate: a data driven discussion about climate sensitive diseases”.

**Mohammed H, Lee E, Hunsberger E, Arguello F, Hayden M, Revan F and Krecek R. American Society of Tropical Medicine and Hygiene.** Washington, D.C. November 19, 2009. Peer reviewed poster. “Dengue Seroprevalence in a Campus Community in St. Kitts and Nevis”.

**Hayden M. American Association for the Advancement of Science.** Congressional Briefing. Washington, D.C. November 16, 2009. “Climate Change and Vector-borne Diseases”.

**Hayden M. Climate and Health Colloquium.** Boulder, CO July 13-17, 2009. “Other (Human) Dimensions to Climate Change Research” Transdisciplinarity – what exactly are we talking about?”

**Hayden M, Zielinski-Gutierrez E, Uejio C, Barrera R, et al. American Society of Tropical Medicine and Hygiene.** New Orleans, LA, December 2008. “Waste Tires and Risk for Dengue Fever Infection in Brownsville, TX and Matamoros, MX.”

**Hayden M. NOAA/NCAR Seminar Series.** November 10, 2008. Boulder, CO. “Weather, Climate and Dengue Fever”.

**Hayden M. Inter-America Institute Water Resources Workshop.** October 6-16, 2008. Mendoza, Argentina. “Weather, Climate and Vector-borne Diseases”.

**Hayden M** and Zielinski-Gutierrez E. **Disasters and Behavioral Health Conference.** July 8-10, 2008. Colorado Springs, CO. “An Ecological Model for Examining Population/Community Resilience”.

**Hayden M** and Pulwarty R. **Gordon Research Conference. Oceans and Human Health.** June 29-July 4, 2008. Tilton, NH. ”Climate Change and Health: Linking Qualitative and Quantitative Approaches to Inform Adaptation”.

**Hayden M. Tulane University School of Public Health.** January 23, 2008. New Orleans, LA. “Weather, Climate and Health”.

**Hayden M. American Meteorological Society Annual Meeting.** January 20-24, 2008. New Orleans, LA. Symposium chair. “Connecting Research and Applications for the Benefit of Society”.

**Hayden M.** and Robles, JL. **US-MX Border Health Association Annual Meeting.** May 20-22, 2007. South Padre Island, TX. “Dengue Fever Outbreak in Brownsville, TX and Matamoros, Tamaulipas”.

**Hayden M,** Zielinski-Gutierrez E, Fonseca-Ford M, and Waterman S. **Conference of Latin American Geographers.** May 31- June 2, 2007. Colorado Springs, CO. “WNV Educational Materials for Low Literacy Audiences”.

**Hayden M.** and Robles, JL. **US-MX Border Health Association Annual Meeting.** May 20-22, 2007. South Padre Island, TX. “Dengue Fever Outbreak in Brownsville, TX and Matamoros, Tamaulipas”.

**Hayden M** and Uejio C. **Arizona Vector-borne and Zoonotic Diseases Conference.** May 1-2, 2007. Mesa, AZ. “The Re-Invasion of *Aedes aegypti* in southern Arizona/northern Mexico”.

**Hayden M,** Ramos M, Mohammad H, Zielinski-Gutierrez E, and Waterman S. **Arizona Vector-borne and Zoonotic Diseases Conference.** May 1-2, 2007. Mesa, AZ “Dengue and Dengue Hemorrhagic Fever on the Texas/Mexico Border—Brownsville and Matamoros, 2005”.

**Hayden M,** Zielinski-Gutierrez E, Fonseca-Ford, M, Gleckler E and Waterman S. **Arizona Vector-borne and Zoonotic Diseases Conference.** May 1-2, 2007. Mesa, AZ “West Nile Virus Prevention, Education and Outreach to Migrant Workers”.

**Hayden M** and Zielinski-Gutierrez E. **American Society of Tropical Medicine and Hygiene.** Atlanta GA November 11-16, 2006. Symposium co-chair: “Walking the Line: Emerging Infectious Diseases along the US-Mexico Border”.

Ramos M, Robles JL, Smith B, Burton R, **Hayden M**, Zielinski-Gutierrez E, Mohammed H, Biggerstaff B, Wenzel S, Ayala A, Brunkard J, Sosa I, Waterman S, Muñoz J, Beatty M. **US/MX Border Health Association**. Monterey, MX. May 2006. “Dengue at the US–Mexico Border—Brownsville and Matamoros, December 2005”.

Zielinski-Gutierrez E, **Hayden M**, Fonseca M, Gleckler E and Waterman S. **International Conference on Emerging Infectious Diseases**. Atlanta, GA. March 19-22, 2006. Peer-reviewed poster. “Increasing Insect Repellent Use Among Latinos: Production of Appropriate Educational Materials”.

**Hayden M**, Grunfest E, Benight C, Barnes L, Williams E, Jenkins C, Drobot S and Schultz, D. **Association of American Geographers**. Chicago, IL, March 7-11, 2006. “The Warning Project: Sources of Information for Flash Flood and Tornado Warnings”.

**Hayden MH**, and Uejio CK. **American Meteorological Society**. Atlanta, GA, Jan 29-Feb 3, 2006. “The Re-invasion of *Aedes aegypti* in southern Arizona/northern Mexico”.

**Hayden M** and Zielinski-Gutierrez E. **American Society for Tropical Medicine and Hygiene**. Washington, DC. Dec. 11-15, 2005. Symposium co-chair: “The Role of Human Ecology in the Transmission of Vector-Borne Diseases”.

**Hayden M** and Zielinski-Gutierrez E. **National Center for Atmospheric Research (NCAR)**. Boulder, CO. Nov. 7-11, 2005. Weather and Society Integrated Studies (WAS\*IS) Workshop. “Qualitative Research Methods”.

**Hayden M**, Grunfest E, Benight, C, Barnes, L, Williams, E, Jenkins, C, and Thurman, M. **International Society for the Study of Traumatic Stress**. Toronto, Canada. Nov. 2-5, 2005. “False Alarms and Short-Fuse Disasters”.

**Hayden M**, Barnes L, Benight C, Thurman M. and Grunfest E. **National Hydrologic Warning Council**. Sacramento, CA. May 17-20, 2005. “The Warning Project: Using Geographic and Psychological Components to Understand Warning Response and Improve Warning Messages for Short-Fuse Weather Events”.

**Hayden M**, Zielinski-Gutierrez E, Fonseca-Ford M, Navarro E, Nava L, and Waterman S. **National West Nile Virus Conference**. San Jose, CA. February 8-9, 2005. Peer-reviewed poster presentation. “Knowledge, Attitudes, and Practices Concerning West Nile Virus on the California/Baja California Border”.

**Hayden M** and Trtanj J. **American Society for Tropical Medicine and Hygiene**. Miami, FL. November 7-11, 2004. Symposium co-Chair: “Infectious Disease Prediction, Prevention, and Preparedness”.

**Hayden M** and Moreno R. **American Society for Tropical Medicine and Hygiene**. Miami, FL. November 7-11, 2004. Oral Presentation: “A Web-Based Model for

Incorporating Environmental Factors in *Aedes aegypti* Surveillance in the Desert Southwest”.

**Hayden M. Climate and Health Summer Colloquium, National Center for Atmospheric Research.** Boulder, CO. July 21-28, 2004. “An Interdisciplinary Model for Dengue Fever Research”.

**Hayden M. Arizona Department of Health Services Zoonotic and Vector-Borne Disease Conference.** Mesa, AZ. April 13-15, 2004. “Dengue in the Desert? The Re-Invasion of *Aedes aegypti* in the Desert Southwest”.

Moreno R and **Hayden M. Association of American Geographers.** Philadelphia, PA. March 14-19, 2004. “Web-based Spatial Information System for Documenting *Aedes aegypti* Breeding Sites along the US/Mexico Border.”

Zielinski-Gutierrez E and **Hayden M. International Conference on Emerging Infectious Diseases.** Atlanta, GA. February 29-March 3, 2004. Peer-reviewed poster presentation. “The Evolution of WNV Prevention Messages in the US: the Move Westward”.

**Hayden M. American Public Health Association.** San Francisco, CA. November 15-19, 2003. International Health Division. “The Potential for the Re-Emergence of Dengue Fever along the U.S. Mexico Border in the southwestern United States.

**Hayden M. Centers for Disease Control and Prevention Border Infectious Disease Surveillance (BIDS) Project.** Cuernavaca, MX. September 2003. “Dengue along the U.S. Mexico Border.”

### Awards

2003 University of Colorado, Denver, Outstanding PhD Student

2006 Gorgas Memorial Institute Research Award, American Society of Tropical Medicine and Hygiene

2007 American Public Health Association, National 2007 APHA Public Health Promotion Contest: Best Print Materials

### Research Support

**Co-Principal Investigator/Project Director.** (with C. Janes) National Oceanic and Atmospheric Administration (NOAA), Office of Global Programs (OGP). Climate Variability and Human Health (NOAA OGP) funded study. “The Potential for the Emergence of Dengue Fever along the U.S./Mexico border in SW Arizona/NW Mexico”. Funded 7/02-7/05

**Principal Investigator.** Network Information and Space Security Center. “Multi-Agency Model of Bi-National Cooperation along the U.S./Mexico Border”. Funded 2/04-2/05

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**Co-Principal Investigator.** (with S. Waterman) Border Infectious Disease Surveillance Project (BIDS), Centers for Disease Control and Prevention. West Nile Virus along the CA/MX Border. May 2004 and June 2005.

**Principal Investigator.** NOAA OGP supplement. “Dengue Fever Research”. Funded 9/05 – 7/06

**Co-Principal Investigator.** (with M. Ramos) Border Infectious Disease Surveillance Project (BIDS), Centers for Disease Control and Prevention. Dengue Fever Outbreak Investigation – Brownsville, TX/Matamoros, MX. December 2005.

**Principal Investigator.** Gorgas Memorial Institute Award. American Society of Tropical Medicine and Hygiene. “Dry season investigation of *Aedes aegypti* abundance in neighborhoods with high and low dengue incidence and persistence in metropolitan San Juan, Puerto Rico” Funded 11/06-11/07

**Principal Investigator. PAHO.** “Human-Environmental Interaction and the Effect of Waste Tire Removal on Risk for Dengue Fever Infection in Brownsville, TX and Matamoros, MX” Funded 4/07-4/08

**Co-Principal Investigator** (with O. Wilhelmi). **SERE/ISSE.** “Spatial Assessment of Vulnerability to Extreme Heat in Phoenix, AZ”. Funded 3/08-8/09.

**Co-Investigator.** (with R. Pandya) **Google, Inc.** “A prototype Earth-gauging system integrating weather and health data to manage meningitis”. Funded 10/08-9/11.

**Principal Investigator. CDC.** “NCAR-Centers for Disease Control and Prevention (CDC) Joint Postdoctoral Fellowship Program”. Funded 10/01/09-9/30/11

**Co-Principal Investigator.** (with O. Wilhelmi) **NASA.** “System for Integrated Metropolitan Modeling of Extreme heat Risk” - SIMMER. Funded 7/10-6/13.

**Co-Principal Investigator** (with A. Monaghan). **NSF.** “The vector mosquito *Aedes aegypti* at the margins: sensitivity of a coupled natural and human system to climate change”. Funded 10/10-9/13

**Principal Investigator. NASA** “Investigating the potential range expansion of the vector mosquito *Aedes aegypti* in Mexico with NASA Earth Science remote sensing results”. Funded 3/11-3/12.

**Principal Investigator.** (with K. Ernst, U of AZ) *Ae. aegypti* in Key West, Fl and Tucson, AZ. **NIH/R56.** 11/11-8/12

**Principal Investigator. CDC.** “NCAR-Centers for Disease Control and Prevention (CDC) Joint Postdoctoral Fellowship Program”. Funded 7/12-6/17

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**Co-Principal Investigator. NSF/CNH.** (with C. Wiedinmyer, NCAR) “Cooking up Clean Air -- Scaled-up Air Quality and Health Impacts of Clean Cookstoves in Ghana.” Funded 9/12-8/15.

**Principal Investigator.** (with K. Ernst, U of AZ) **NIH/RO1.** “On the Edge: The Impact of Climate Change on *Aedes aegypti* in the U.S.” Funded 8/12-7/16.

**Principal Investigator. CDC .** “Development of predictive risk models for tick-borne diseases based on meteorological descriptors”. Funded 10/13-10/14

**Principal Investigator. CDC.** “Research Cooperative Agreement; Rat Ecology in Uganda”. Funded 9/14-9/15.

### **Service Activities**

#### ***Commissions/Boards:***

Board on Environment and Health – AMS

Commission to Engage African Americans on Climate Change – Joint Center for Political and Economic Studies

Societal Impacts Board – AMS

Board on Enterprise Economic Development - AMS

Scientific Advisory Board – Border Infectious Disease Surveillance (CDC)

Scientific Program Committee for Global Health – American Society for Tropical Medicine and Hygiene

SOARS Steering Committee - NCAR

#### ***Panels:***

NOAA Oceans and Human Health Proposal Review Panel

NSF Proposal Review Panel

NASA GPM workshop – Panel on Ecological Forecasting for Public Health

#### ***Workshops:***

Climate and Health Colloquium – co-organizer - NCAR July 2009

IAI-NCAR Colloquium – assisted with planning – San Jose, CR April 2010

Climate and Health Colloquium – organizer - NCAR July 2011

Climate and Health Colloquium – organizer – NCAR July 2013

#### ***Agency Interactions:***

Guest Researcher – CDC

#### ***Journal Reviewer:***

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BAMS

EcoHealth

Environmental Health Perspectives

Health and Place

Interdisciplinary Perspectives on Infectious Diseases

International Journal of Biometeorology

International Journal of GIS

Journal of Climate

Lancet Infectious Diseases

PLoS Neglected Tropical Diseases

PLoS ONE

Vector-borne and Zoonotic Diseases

Weather, Climate and Society

**Student Mentoring:**

SOARS Mentor – 2006-2010

HIRO Mentor - 2011

MA – M. Klaber – University of Colorado, Colorado Springs

PhD – M. Loughnan – Monash University, Melbourne, Australia

Phd – Carolina Ochoa – Universidad Veracruzana, Xalapa, MX