



# PROGRAM

49<sup>th</sup> Annual Meeting and Symposium

Hybrid

February 21, 22, and 23, 2024

**SYMPOSIUM CHAIR:** *Mari Quillman*

**PROGRAM CHAIR:** *Kristin H. Berry*

**MEETING CHAIRS:** *Ed LaRue, Bruce Palmer, and Luke Basulto*

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**ZOOM SUPPORT to SPEAKERS:** *David Hedrick, Operations Manager*

**AUDIOVISUAL AND TECHNICAL SUPPORT:** *David Carr*

**COORDINATION WITH SPONSORS:** *Mari Quillman*

**PHOTOGRAPHY CONTEST:** *Joe Probst, Maggie Fusari, and Par Singhaseni*

**AWARDS:** *Kristin H. Berry*

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**RAFFLE CHAIR:** *Mari Quillman*

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## **REQUIREMENTS FOR SPEAKERS AND PRESENTATIONS**

The Desert Tortoise Council **does not permit inappropriate images** as part of presentations in the program or as any part of symposia. Inappropriate photos include, but are not limited to: vulgar, lewd, or suggestive images of people; people in awkward positions or scanty attire; and people engaged in personal and private activities. The Desert Tortoise Council expects all participants and speakers to maintain a high level of professionalism.

### **Guidelines for Asking and Answering Questions at the Symposium**

Several years ago, several attendees approached members of the Board of Directors with concerns about the tone of questions to speakers. The concerned parties included members of the audience as well as speakers. Some members of the audience noted that some questioners appeared to be vitriolic and angry; some questioners used the opportunities at the microphone to present their views in long winded soliloquies rather than to ask questions. Furthermore, some speakers were irritated with the questions asked of them. To avoid a similar occurrence at future meetings, the Board of Directors developed guidelines for asking and answering questions at Symposia. These guidelines offer an opportunity to review the purpose for holding annual symposia and to reiterate our long-standing policy of professionalism and civility to all participants.

The Desert Tortoise Council promotes conservation of the desert tortoise in a variety of ways, including annual symposia. One purpose of the symposia is to bring together scientists, wildlife biologists, managers, representatives of non-government organizations, and other interested parties to share the latest information on tortoises and their management. The speakers vary in their interests and areas of expertise, as well as in experience in giving presentations. Some speakers are giving their very first public presentations; others have presented hundreds of lectures and power point programs. All are welcome. The symposium is a learning experience and learning is facilitated by respect and courtesy. All speakers should receive courteous and professional treatment and, in turn, all speakers should treat the audience with respect. By following the simple guidelines outlined above, the Board hopes to have a collegial atmosphere and productive meeting.

To assist with the policy of professional and civil behavior, the Board requests that questioners follow the guidelines listed below:

1. Ask one question at a time. If you have two questions, do not ask both at once. Allow the speaker to answer the first question before proceeding to the second question.
2. If more than one person is waiting to ask, then ask only one question.
3. All questions are legitimate. However, the way the question is framed is usually the issue. Each question can be framed in a professional and courteous manner. Speakers, too, can draw on the following guidelines when answering questions.
4. Speakers should consider that all questions are legitimate and fair. However, some may be poorly worded because the questioner may not fully understand the subject or may need some

assistance in framing the question in a professional manner. The speaker may need to clarify the question and should then repeat the question to the audience so that the audience will hear it clearly.

5. Some questions are not easily answered for a variety of reasons: no data, insufficient data, topic cannot be discussed because court proceedings are underway, etc. The speakers should state why the question cannot be answered or can only be addressed in part. The speaker may need to think at length about an appropriate answer and, in such cases, may need to say just that. The speaker may refer the questioner to the email in the Abstracts.

# PROGRAM

## 49<sup>th</sup> ANNUAL DESERT TORTOISE COUNCIL SYMPOSIUM (Hybrid)

Held February 21<sup>st</sup>, 22<sup>nd</sup>, and 23<sup>rd</sup>, 2024

South Point Hotel, Casino, and Spa, Las Vegas, Nevada

All sessions and presentations are in Pacific Standard Time

**Note:** Speakers are the first person noted for each presentation unless \*denotes otherwise  
**Raffles and announcements shall be held at the end of each break and day**

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### FEBRUARY 20, TUESDAY EVENING

6:00 p.m.      **Pre-Conference Mixer with food, beer, and wine**  
*Sponsored by Southern Nevada Environmental, Inc.*

### FEBRUARY 21, WEDNESDAY MORNING

8:00 a.m.      **Annual Business Meeting of the Desert Tortoise Council**  
*Mari Quillman, Chair, Desert Tortoise Council, Acton, CA, and ECORP Consulting, CA*

9:30 a.m.      **Introduction of Desert Tortoise Council Chair, Meeting Chairs and Opening Remarks**  
*Mari Quillman, Chair; Ed LaRue, Bruce Palmer, and Luke Basulto, Meeting Chairs: Members, Board of Directors of the Desert Tortoise Council, Acton, CA,*

9:50 a.m.      **Desert Tortoise Council Activities - 2023**  
*Mari Quillman, Chair: Desert Tortoise Council Board of Directors: Acton, CA; and ECORP Consulting, Inc., Santa Ana, CA*

### Session 1. Celebrating Advances in Research into Radionuclides in Turtles and Tortoises

10:05 a.m.      **Winners of the 2023 Robert C. Stebbins Research Award**

#### **Anthropogenic uranium signatures in turtles, tortoises, and sea turtles from nuclear sites**

*Cyler Conrad<sup>1,2</sup>, J. Inglis<sup>3</sup>, A. Wende<sup>3</sup>, M. Sanborn<sup>3</sup>, N. Mukundan<sup>3</sup>, A. Price<sup>3</sup>, T. Tenner<sup>3</sup>, K. Wurth<sup>3</sup>, B. Naes<sup>3</sup>, J. Fair<sup>4</sup>, E. Middlebrook<sup>4</sup>, S. Gaukler<sup>1</sup>, J. Whicker<sup>1</sup>, J.L. Gerard<sup>1</sup>, W.T. Aguilera<sup>5,6</sup>, J.P. Gibbs<sup>5,7</sup>, B. Wolf<sup>8</sup>, T.K. Kattil-deBrum<sup>9</sup>, M. Hagemann<sup>10</sup>, J.A. Seminoff<sup>11</sup>, T. Brys<sup>12</sup>, R. Brown<sup>13</sup> and K.M. Derieg<sup>14</sup>: <sup>1</sup>Pacific Northwest National Laboratory, Richland, WA; <sup>2</sup>University of New Mexico, Albuquerque, NM; <sup>3</sup>Los Alamos National Laboratory, Los Alamos, NM; <sup>4</sup>Genomics and Bioanalytics Group, Los Alamos National Laboratory, Los Alamos, NM; <sup>5</sup>Galápagos Conservancy, Fairfax, VA; <sup>6</sup>University of Málaga, Málaga, Spain; <sup>7</sup>State University of New York, Syracuse, NY; <sup>8</sup>Department of Biology, University of New Mexico, Albuquerque, NM; <sup>9</sup>University of Washington, Seattle, WA; <sup>10</sup>Bishop Museum, Honolulu, HI; <sup>11</sup>NOAA-Southwest Fisheries Science Center, La Jolla, CA; <sup>12</sup>Perot Museum of Nature and Science, Dallas, TX; <sup>13</sup>University of Kansas, Lawrence, KS*

- 10:40 a.m. Questions for the speaker and discussion
- 10:55 a.m. **Anthropogenic uranium and plutonium radionuclides in 20<sup>th</sup> century desert tortoises**  
*Cyler Conrad<sup>1,2</sup>, J. Inglis<sup>3</sup>, A. Price<sup>3</sup>, A. Wende<sup>3</sup>, M. Sanborn<sup>3</sup>, N. Mukundan<sup>4</sup>, T. Tenner<sup>3</sup>, K. Wurth<sup>3</sup>, B. Naes<sup>3</sup>, K.H. Berry<sup>5</sup>, K.M. Derieg<sup>6</sup>, M.A. Walden<sup>7</sup>, T. Esque<sup>8</sup>, D. Hall<sup>9</sup>, J. Perry<sup>9</sup>, J. Fair<sup>3</sup>, E. Middlebrook<sup>3</sup>, S. Gaukler<sup>3</sup>, J. Stanek<sup>3</sup>, J. Celmer<sup>3</sup>, J. Whicker<sup>3</sup>, J.L. Gerard<sup>3</sup>, W.T. Aguilera<sup>12,13</sup>, J.P. Gibbs<sup>14</sup>, and B. Wolf<sup>2</sup>:*  
<sup>1</sup>Pacific Northwest National Laboratory, Richland, WA; <sup>2</sup>University of New Mexico, Albuquerque, NM; <sup>3</sup>Los Alamos National Laboratory, Los Alamos, NM; <sup>4</sup>University of California, San Diego; <sup>5</sup>U.S. Geological Survey, Reno, NV; <sup>6</sup>University of Utah, Salt Lake City, UT; <sup>7</sup>University of Nevada–Reno, NV; <sup>8</sup>U.S. Geological Survey, Boulder City, NV; <sup>9</sup>Nevada National Security Site, N. Las Vegas, NV; <sup>12</sup>Galápagos Conservancy, Fairfax, VA; <sup>13</sup>University of Málaga, Spain; and <sup>14</sup>State University of New York, Syracuse, NY

Session 2. Anthropogenic Effects of Solar Energy Development and Roads

- 11:10 a.m. **Effects of fixed and tracking monofacial photovoltaic solar arrays on the operative temperatures available to a 4 kg Mojave desert tortoise. Student Paper.**  
*Adrian C. Slade<sup>1</sup> and Kerry L. Holcomb<sup>2</sup>: <sup>1</sup>Central Washington University, Ellensburg, WA; <sup>2</sup>U.S. Fish and Wildlife Service, Palm Springs, CA*
- 11:25 a.m. **Vegetation cover, topography, and low-traffic roads influence habitat use and movement of Sonoran desert tortoises. Student Paper.**  
*Sean Sutor, Nancy E. McIntyre, and Kerry Griffis-Kyle: Texas Tech University, Lubbock, TX*
- 11:40 a.m. Panel: Questions and Discussion with Cyler Conrad, Adrian Slade, and Sean Sutor
- 11:55 a.m. Break for Lunch

**FEBRUARY 21, WEDNESDAY AFTERNOON**

Session 3. Basic Demography, Ecology and Adaptations of *Gopherus* Species

- 1:30 p.m. **Faster somatic growth may contribute to climate change resilience for a terrestrial vertebrate ectotherm. Student Paper.**  
*M. A. Walden<sup>1</sup>, E. Hunter<sup>2</sup>, K. K. Drake<sup>3</sup>, K. E. Nussear<sup>1</sup>, T. C. Esque<sup>3</sup>, and K. T. Shoemaker<sup>1</sup>: <sup>1</sup>University of Nevada, Reno, NV; <sup>2</sup>Georgia Southern University, Statesboro, GA; and <sup>3</sup>U.S. Geological Survey, Henderson, NV*
- 1:45 p.m. **Thermal ecology, activity patterns, and ecological niche modeling of *Gopherus* tortoises. Student Paper.**  
*Julia Joos and D.B. Miles: Ohio University, Athens, OH*

- 2:00 p.m.      **What's in a bite? Quantifying Mojave desert tortoise (*Gopherus agassizii*) foraging preference and consumed biomass**  
*E. Hwang<sup>1</sup>, \*Caleigh Quick<sup>1</sup>, K. Drake<sup>2</sup>, L. Santillana-Fernandez<sup>1,3</sup>, S. Doyle<sup>1</sup>, and T. Esque<sup>1</sup>: <sup>1</sup>U.S. Geological Survey, Boulder City, NV; <sup>2</sup>U.S. Fish and Wildlife Service, Las Vegas, NV; and <sup>3</sup>University of Washington, Seattle, WA*
- 2:15 p.m.      **Environment and diet influence fungal and bacterial gut microbiomes of Agassiz's desert tortoise (*Gopherus agassizii*) in California**  
*Brendan J. O'Brien<sup>1,2</sup>, Brian T. Henen<sup>3</sup>, Mia R. Maltz<sup>1,4</sup>: <sup>1</sup>CoRenewal Inc., Cathedral City, CA; <sup>2</sup>Hyphae Consulting, Inc., Huntington, VT; <sup>3</sup>Marine Air Ground Task Force Training Command, Twentynine Palms, CA; and <sup>4</sup>University of Connecticut, Storrs, CT*
- 2:30 p.m.      Panel: Questions and Discussion
- 2:45 p.m.      Break
- 3:00 p.m.      Break

Session 4. Genotypes, Genomes, and Genetic Uses in Studies of Behavior

- 3: 30 p.m.      **Comparative genomic analysis of Sonoran and Mojave desert tortoises (*Gopherus morafkai* and *G. agassizii*) to identify the genetic basis of desert adaptations. Student Paper.**  
*Sarah Baty<sup>1</sup>, R. Araya-Donoso<sup>1</sup>, J. Mellor<sup>2</sup>, A. Paulsen<sup>1</sup>, K. Kusumi<sup>1</sup>, and G.A. Dolby<sup>2</sup>: <sup>1</sup>Arizona State University, Tempe, AZ; and <sup>2</sup>University of Alabama at Birmingham, AL*
- 3:45 p.m.      **Tracking movement and breeding of Mojave desert tortoises using genetic pedigrees**  
*Amy Vandergast<sup>1</sup>, A. Mittelberg<sup>1</sup>, S. Hromada<sup>2</sup>, F. Chen<sup>1</sup>, A.M. McDonald<sup>1</sup>, B.O. Gottsacker<sup>1</sup>, K. Nussear<sup>3</sup>, T. Esque<sup>1</sup>: <sup>1</sup>U. S. Geological Survey, San Diego, CA; <sup>2</sup>Conservation Science Partners, Inc. Truckee, CA; and <sup>3</sup>University of Nevada, Reno*
- 4:00 p.m.      **Inferring social contact networks in desert tortoises using fine scale GPS data - are they a solitary species, or is Bacon's law alive and well?**  
*Kenneth. E. Nussear<sup>1</sup>, Steve Hromada<sup>1</sup>, Justice Best<sup>1</sup>, Felicia Chen<sup>2</sup>, Todd C Esque<sup>2</sup>, and Amy Vandergast<sup>2</sup>: <sup>1</sup>University of Nevada, Reno NV; and <sup>2</sup>U.S. Geological Survey, Las Vegas NV, and San Diego CA*
- 4:15 p.m.      Panel: Questions and Discussion

Session 5. Passings of Note in 2023

- 4:30 p.m.      **Dan Pearson and Linda Mitrovich**  
*Kristin Berry and Mari Quillman*
- 4:45 p.m.      Announcements and Visits to the Posters

6:00 p.m. Mixer with no-host bar and food

## **FEBRUARY 22, THURSDAY MORNING**

### **Session 6. The Recovery Program for Bolson Tortoises and Surveys in Mexico**

- 7:55 a.m. Announcements
- 8:00 a.m. **Bolson tortoise conservation in the United States**  
*Vance Wolf: U.S. Fish and Wildlife Service, Albuquerque, NM*
- 8:15 a.m. **Building a bolson tortoise (*Gopherus flavomarginatus*) recovery program in the US**  
*Christiane Wiese and L.S. Hillard: Turner Endangered Species Fund, Caballo, NM*
- 8:30 a.m. **Use of aerial drones to locate Bolsón tortoise populations in the Bolsón de Mapimi, Mexico**  
*Michael W. Tuma<sup>1,2,3</sup>, M. Bandy<sup>3</sup>, R. Palomo-Ramos<sup>4</sup>, and R. Kiester<sup>4</sup>:*  
*<sup>1</sup>FirstCarbon Solutions, Inc., Irvine, CA; <sup>2</sup>University of Southern California, Los Angeles, CA; <sup>3</sup>Resi Solutions, Albuquerque, NM; <sup>4</sup>Turtle Conservancy, Ojai, CA*
- 8:45 a.m. Panel: Questions and Discussion

### **Session 7. PLENARY SPEAKER and DISCUSSION**

- 9:00 a.m. **Earth beyond six of nine planetary boundaries**  
*Katherine Richardson<sup>1</sup>, W. Steffen<sup>2†</sup>, W. Lucht<sup>3,4</sup>, J. Bendtsen<sup>1</sup>, S.E. Cornell<sup>5</sup>, J.F. Donges<sup>3,5</sup>, M. Driike<sup>3</sup>, I. Fetzer<sup>5,6</sup>, G. Bala<sup>7</sup>, W. von Bloh<sup>3</sup>, G. Feulner<sup>3</sup>, S. Fiedler<sup>8</sup>, D. Gerten<sup>3,4</sup>, T. Gleeson<sup>9,10</sup>, M. Hofmann<sup>3</sup>, W. Huiskamp<sup>3</sup>, M. Kummu<sup>11</sup>, C. Mohan<sup>8,12,13</sup>, D. Nogués-Bravo<sup>1</sup>, S. Petri<sup>3</sup>, Miina Porkka<sup>11</sup>, S. Rahmstorf<sup>8,14</sup>, S. Schaphoff<sup>8</sup>, K. Thonicke<sup>3</sup>, A. Tobian<sup>3,5</sup>, V. Virkki<sup>11</sup>, L. Wang-Erlandsson<sup>3,5,6</sup>, L. Weber<sup>8</sup>, J. Rockström<sup>3,5,15</sup>.* *<sup>1</sup>University of Copenhagen, Denmark; <sup>2</sup>Australian National University, Canberra, Australia; <sup>3</sup>Potsdam Institute for Climate Impact Research, Potsdam, Germany; <sup>4</sup>Humboldt-Universität zu Berlin, Berlin, Germany; <sup>5</sup>Stockholm University, Sweden; <sup>6</sup>Bolin Centre for Climate Research, Stockholm University, Sweden; <sup>7</sup>Indian Institute of Science, Bangalore, India; <sup>8</sup>Christian-Albrechts-University Kiel, Germany; <sup>9</sup>University of Victoria, British Columbia, Canada; <sup>10</sup>University of Victoria, Victoria, B.C., Canada; <sup>11</sup>Aalto University, Espoo, Finland; <sup>12</sup>University of Saskatchewan, Canada; <sup>13</sup>Waterplan (UC S21), San Francisco, CA, USA; <sup>14</sup>University of Potsdam, Germany; and <sup>15</sup>University of Potsdam, Germany*
- 9:35 a.m. Questions and Discussion
- 9:55 a.m. Break



Session 8. Significant Conservation Issues for Desert Tortoises

- 10:20 a.m.     **Desert tortoise protection and recovery: The slide towards extinction?**  
*Ileene Anderson,<sup>1</sup> L. Belenky,<sup>2</sup> and P. Donnelly<sup>2</sup>: Center for Biological Diversity,  
<sup>1</sup>Oakland, CA; and <sup>2</sup>Las Vegas, NV*
- 10:40 a.m.     **The Northern Corridor Highway and the Washington County Habitat  
Conservation Plan—two roads to nowhere**  
*Todd Tucci: Advocates for the West, Boise, ID*
- 11:00 a.m.     **Using Areas of Critical Environmental Concern to conserve desert tortoises**  
*Laura M. Cunningham<sup>1</sup> and Kevin R. Emmerich<sup>2</sup>: <sup>1</sup>Western Watersheds Project,  
Beatty NV; and <sup>2</sup>Basin and Range Watch, Beatty, NV*
- 11:15 a.m.     Panel: Questions and Discussion

Session 9. FEATURED SPEAKER: Bonnie L. Raphael on health and disease for re-wilding Radiated  
Tortoises

- 11:30 a.m.     **Interpreting laboratory results and protecting the health of wild and captive  
chelonians while preparing Radiated Tortoises (*Astrochelys radiata*) for  
rewilding**  
*Bonnie L. Raphael<sup>1</sup>, M.B. Brown<sup>2</sup>, T.F. Rakotonanahary<sup>1</sup>, A.N. Claudin<sup>3</sup>, J.  
Palmer<sup>3</sup>, S. Perry<sup>4</sup>, S. Bartlet<sup>5</sup>, P.P. Calle<sup>5</sup>, K. Toregrossa<sup>5</sup>, S. O'Brien<sup>3</sup>, K.  
Apakupakul<sup>3</sup>, A.M. Brune<sup>2</sup>, S. Nelson<sup>6</sup>, R. Vetter<sup>1</sup>, M. Evans<sup>7</sup> Jessica Mitia  
Koloina Andrianantenaina<sup>8</sup>, Rakotobe Tindra Navalona<sup>8</sup>, J.L. Rabeloson<sup>8</sup>,  
M.M. Tolojanahary<sup>8</sup>, C.A. Rasolondraibe<sup>1</sup>, T.D. Ralivaniaina<sup>1</sup>, F.  
Rasambainarivo<sup>9</sup>, S. Randrianarisoa<sup>9</sup>, S.L.Deem<sup>3</sup>: <sup>1</sup>Turtle Survival Alliance,  
Madagascar, Paraguay, Charleston, SC; <sup>2</sup>University of Florida, Gainesville,  
FL; <sup>3</sup>Saint Louis Zoo, MO; <sup>4</sup>Mississippi Aquarium Gulfport, MS; <sup>5</sup>Wildlife  
Conservation Society, Bronx, NY; <sup>6</sup>Zoo Knoxville, TN; <sup>7</sup>Smithsonian Institute,  
National Zoo, Washington, DC; <sup>8</sup>Université d'Antananarivo; and <sup>9</sup>Mahaliana  
Wildlife Laboratory, Antananarivo, Madagascar*
- 11:50 a.m.     Questions and Discussion
- 12:00 p.m.     Lunch Break

**FEBRUARY 22, THURSDAY AFTERNOON**

Session 10. The Latest Research on Distribution, Genomics, and Pathogenicity of Infectious  
Diseases in Tortoises

- 1:25 p.m.     Announcements
- 1:30 p.m.     **Comparative genomics of *Mycoplasma agassizii* isolates from wild *Gopherus*  
species, wild *Astrochelys radiata*, and captive *Manouria emys***  
*Alexandra Burne<sup>1</sup>, D. Michaels<sup>1</sup>, B. Raphael<sup>2</sup>, and M.B. Brown<sup>1</sup>: <sup>1</sup>University of  
Florida, Gainesville, FL; and <sup>2</sup>Turtle Survival Alliance, Charleston, SC*

- 1:45 p.m.      **We aren't mucin around: The evolution of disparate mucin arrays in *Gopherus morafkai* and *G. agassizii*. Student Paper.**  
*Jade Mellor<sup>1</sup>, S.M. Baty<sup>2</sup>, K. Kusumi<sup>2</sup>, and G.A. Dolby<sup>1</sup>: <sup>1</sup>University of Alabama at Birmingham, Birmingham, AL; and <sup>2</sup>Arizona State University, Tempe, AZ*
- 2:00 p.m.      **The invertebrate *Galleria mellonella* differentiates virulence potential between species and strains of *Mycoplasma agassizii* and *Mycoplasma testudineum***  
*Alexandra Burne, D. Michaels, and M.B. Brown: University of Florida, Gainesville, FL*
- 2:15 p.m.      **Were *Mycoplasma testudineum* and Testudinid herpesvirus present between 1992 and 1995 and later at three sites in the Mojave Desert? Answers from archived and other samples**  
*Kristin H. Berry<sup>1</sup>, F. Origgi<sup>2</sup>, and M.B. Brown<sup>3</sup>: <sup>1</sup>U.S. Geological Survey, Reno, NV; <sup>2</sup>University of Messina, Italy, and University of Bern, Switzerland; and <sup>3</sup>University of Florida, Gainesville, FL*
- 2:30 p.m.      **Distribution of *Mycoplasma spp.* across the Texas range of *Gopherus berlandieri*. Student Paper.**  
*Jacquelyn Tleimat<sup>1</sup>, P. Crump<sup>2</sup>, G. Dolby<sup>3</sup>, K. Kusumi<sup>4</sup>, and S.F. McCracken<sup>1</sup>: <sup>1</sup>Texas A&M University – Corpus Christi, TX; <sup>2</sup>Texas Parks and Wildlife Department, Austin, TX; <sup>3</sup>University of Alabama at Birmingham, AL; and <sup>4</sup>Arizona State University, Tempe, AZ*
- 2:45 p.m.      Panel: Questions and Discussion
- 3:00 p.m.      Break

#### Session 11. Government Reports on Status of Recovery Efforts

- 3:30 p.m.      **U.S. Fish and Wildlife Service desert tortoise recovery updates: An ongoing need for integrated recovery actions and future collaboration**  
*Rebecca Windsor: U.S. Fish and Wildlife Service, Las Vegas, NV*
- 3:45 p.m.      **The California Department of Fish and Wildlife's report on the status of the Mojave desert tortoise (*Gopherus agassizii*)**  
*Anne Hilborn: California Department of Fish and Wildlife, West Sacramento, CA*
- 4:00 p.m.      **Mojave National Preserve recovery update**  
*Michael Burchett, N. Darby, D. Hughson, M. Ogawa: Mojave National Preserve, Barstow CA*
- 4:15 p.m.      **Clark County Multiple Species Habitat Conservation Plan Update**  
*Scott Cambrin: Clark County Desert Conservation Program, Las Vegas, NV*
- 4:30 p.m.      Panel: Questions and Discussion
- 4:45 p.m.      Adjourn to see presentations by authors of Posters

- 5:30 p.m. No host mixer
- 6:30 p.m. Dinner
- 7:30 p.m. Winners of the Photography Contest  
*Joe Probst*
- 7:45 p.m. Winner of the David J. Morafka Memorial Research Award  
*Michael W. Tuma*
- 7:50 p.m. Winners of Desert Tortoise Council Awards  
*Kristin H. Berry, Bruce Palmer, and Ed LaRue*
- 8:15 p.m. **Banquet Address: What they do in the shadows: The secret social lives of rattlesnakes**  
*Mark Allen Davis, Illinois Natural History Survey, Prairie Research Institute, University of Illinois Urbana-Campaign, IL*

## **FEBRUARY 23, FRIDAY MORNING**

### **Session 12. Re-wilding of Chelonians, Translocation, and Head-starting**

- 7:55 a.m. Announcements
- 8:00 a.m. **FEATURED SPEAKERS: Bethany Nordstrom and Nicola Mitchell**  
**15 years in: Lessons being learned from assisted colonisation trials of Australia's rarest turtle**  
*\*Bethany Nordstrom<sup>1</sup>, Gerald Kuchling<sup>2</sup>, and \*Nicola Mitchell<sup>1</sup>: <sup>1</sup>The University of Western Australia, Crawley, WA, Australia; and <sup>2</sup>Western Australian Department of Biodiversity, Wanneroo, WA, Australia*
- 8:40 a.m. **Desert tortoise translocation of the Marine Corps Air Ground Combat Center in 2023**  
*Brian T. Henen: Marine Air Ground Task Force Training Command, Twentynine Palms, CA*
- 8:55 a.m. **Head-starting, survival and movement of Mojave desert tortoises at the Marine Corps Air Ground Combat Center**  
*Clay F Noss<sup>1</sup>, Brian Henen<sup>2</sup>, Scott Hillard<sup>3</sup>, Bob Johnson<sup>1</sup>, Lynn Sweet<sup>1</sup>, Ken Nagy<sup>3</sup>: <sup>1</sup>University of California, Riverside, CA; <sup>2</sup>Marine Corps Air Ground Combat Center, Twentynine Palms, CA; and <sup>3</sup>University of California, Los Angeles, CA*
- 9:10 a.m. **The advantage of size in desert tortoise head-starting and the challenge of extreme weather**  
*Brian D. Todd<sup>1</sup>, T.D. Tuberville<sup>2</sup>, K.A. Buhlmann<sup>2</sup>, P.A. McGovern<sup>2</sup>, M.S. Glass<sup>2</sup>, and C.J. Richter<sup>2</sup>:  
<sup>1</sup>University of California at Davis, CA; and <sup>2</sup>University of Georgia, Aiken SC*

- 9:25 a.m.      **Juvenile Mojave desert tortoises shift night microhabitats during summer heatwaves**  
*Thomas A. Radzio, T.T. Hammond, K.N. Rock, R.R. Swaisgood, and M.J. Merrick: San Diego Zoo Wildlife Alliance, San Diego, CA*
- 9:40 a.m.      **Personality, maternal effects, and outcomes in the wild for Mojave desert tortoises (*Gopherus agassizii*)**  
*Talysin T. Hammond, T.A. Radzio, R.R. Swaisgood, M.J. Merrick: San Diego Zoo Wildlife Alliance, San Diego, CA*
- 9:55 a.m.      Panel: Questions and Discussion
- 10:10 a.m.     Break

Session 13. The Impacts Predators Have on Mojave Desert Tortoise Recovery

- 10:30 a.m.     **Understanding how Wile E. Coyote & friends outsmarted us all and the impacts predators have on Mojave desert tortoise recovery**  
*Kristina Drake, K. Field, K. Holcomb, and C. Mitchell: U.S. Fish and Wildlife Service, Las Vegas, NV*
- 10:45 a.m.     **Canid deterrents: Are tools used to deter gray wolves (*Canis lupus*) from depredating livestock applicable in Mojave desert tortoise (*Gopherus agassizii*) recovery efforts?**  
*Elizabeth Willy: U.S. Fish and Wildlife Service, Klamath Falls, Oregon*
- 11:00 a.m.     **Predator-prey dynamics in the Mojave Desert: An ecological Gordian Knot among coyotes, jackrabbits, and desert tortoises**  
*Sean M. Murphy<sup>1</sup>, B.S. Nolan<sup>2</sup>, F.C. Chen<sup>1</sup>, and K.M. Longshore<sup>1</sup>: <sup>1</sup>U.S. Geological Survey, Boulder City, NV*
- 11:30 a.m.     Panel: Questions and Discussion
- 11:45 a.m.     Adjourn for Lunch

**FEBRUARY 23, FRIDAY AFTERNOON**

Session 14: Demography, Modeling, and New Techniques for Studying Tortoises

- 1:25 p.m.      Announcements

- 1:30 p.m.      **An integrated model improves inferences about historical patterns of survival in the Mojave desert tortoise**  
*Steven J. Hromada<sup>1</sup>, L. J. Allison<sup>2†</sup>, A. Collins<sup>1</sup>, J. Dougherty<sup>3</sup>, K.K. Drake<sup>2</sup>, T.C. Esque<sup>4</sup>, B. Folt<sup>1</sup>, J. Freilich<sup>5</sup>, J.E. Lovich<sup>6</sup>, A.M. McLuckie<sup>7</sup>, C.I. Mitchell<sup>2</sup>, K.E. Nussear<sup>3</sup>, K. Shoemaker<sup>8</sup>, M.S. Vamstad<sup>5</sup>, A.G. Vandergast<sup>9</sup>, M.A. Walden<sup>8</sup>, and B.G. Dickson<sup>1</sup>*: <sup>1</sup>Conservation Science Partners, Inc., Truckee, CA; <sup>2</sup>U.S. Fish and Wildlife Service, Las Vegas, NV, and †Reno, NV; <sup>3</sup>University of Nevada, Reno, NV; <sup>4</sup>U.S. Geological Survey, Boulder City, NV; <sup>5</sup>Joshua Tree National Park, Twentynine Palms, CA; <sup>6</sup>U.S. Geological Survey, Flagstaff, AZ; <sup>7</sup>Utah Division of Wildlife Resources, Hurricane, UT; <sup>8</sup>University of Nevada, Reno, NV; and <sup>9</sup>U.S. Geological Survey, San Diego, CA
- 1:45 p.m.      **Using demographic study plots to inform range-wide status for the Mojave desert tortoise**  
*Corey I. Mitchell*: U.S. Fish and Wildlife Service, Tucson, AZ
- 2:00 p.m.      **Using line-distance sampling data to create spatial density analyses that allow for the exploration of covariates of desert tortoise density. Student Paper.**  
*Jacqueline Dougherty<sup>1</sup>, L.J. Allison<sup>2†</sup>, A.M. McLuckie<sup>3</sup>, C. Mitchell<sup>2</sup>, B. Dickson<sup>4</sup>, A. Collins<sup>4</sup>, and K. Nussear<sup>1</sup>*: <sup>1</sup>University of Nevada, Reno, NV; <sup>2</sup>U.S. Fish and Wildlife Service, Las Vegas, NV; <sup>3</sup>Utah Division of Wildlife Resources, Hurricane, UT; and <sup>4</sup>Conservation Science Partners, Inc., Truckee, CA
- 2:15 p.m.      **Spatially explicit estimation of sex- and age class-specific densities of Mojave desert tortoises (*Gopherus agassizii*) within the Naval Air Weapons Station China Lake, California**  
*Sarah M. Doyle<sup>1</sup>, S.M. Murphy<sup>1</sup>, T.C. Esque<sup>1</sup>, K.K. Drake<sup>2</sup>, and J. Hendrix<sup>3</sup>*: <sup>1</sup>U.S. Geological Survey, Boulder City, NV; <sup>2</sup>U.S. Fish and Wildlife Service, Las Vegas, NV; and <sup>3</sup>Naval Air Weapons Station China Lake, CA
- 2:30 p.m.      **Results of the second season of AI-assisted drone surveys in Washington County, Utah**  
*Matthew S. Bandy*: Resi Solutions, Albuquerque, NM
- 2:45 p.m.      **Applications of near remote sensing imagery obtained with unmanned aerial vehicles on evaluating desert tortoise densities at local scales**  
*Justice R. Best<sup>1</sup>, K.E. Nussear<sup>1</sup>, K.K. Drake<sup>3</sup>, and T.C. Esque<sup>1</sup>*: <sup>1</sup>University of Nevada, Reno, NV; <sup>2</sup>U.S. Fish and Wildlife Service, Las Vegas, NV; and <sup>3</sup>U.S. Geological Survey, Boulder City, NV
- 3:00 p.m.      Panel: Questions and Discussion
- 3:15 p.m.      Brief Break

Session 13. Conservation education: potential values and results

- 3:30 p.m.      **Heralds of the future? Mojave Maxine as a possible indicator of climate change**  
*James A. Danoff-Burg: The Living Desert Zoo and Gardens, Palm Desert, CA*
- 3:45 p.m.      **Mojave Desert Tortoise Week 2023: Making outreach count**  
*Kent M. Kowalski: U.S. Fish and Wildlife Service, Palm Springs, CA*
- 3:55 p.m.      **Behavioral change programming to reduce human provided food subsidies for ravens in the desert tortoise's range**  
*Kaitlyn E. Shaw, James Danoff-Burg, and Maya Nuñez: The Living Desert Zoo and Gardens, Palm Desert*
- 4:10 p.m.      Panel: Questions and Discussion
- 4:25 p.m.      Announcement of the Best Student Paper Award  
*Michael W. Tuma*
- 4:35 p.m.      Adjourn

**POSTERS**

**Genome sequencing and annotation of the Texas tortoise (*Gopherus berlandieri*) as a resource for population genetic studies. Student Poster.**

*Jaime Johnson<sup>1</sup>, J. Mellor<sup>2</sup>, S. Baty<sup>1</sup>, J. Tleimat<sup>3</sup>, P. Crump<sup>4</sup>, S.F. McCracken<sup>3</sup>, G. A. Dolby<sup>2</sup>, and K. Kusumi<sup>1</sup>: <sup>1</sup>Arizona State University, Tempe, AZ; <sup>2</sup> University of Alabama at Birmingham, Birmingham, AL; <sup>3</sup>Texas A&M University – Corpus Christi; and <sup>4</sup>Texas Parks and Wildlife Department, Austin, TX*

**Effects of Tropical Storm Hilary on desert tortoise (*Gopherus agassizii*) nest success**

*Reed Q. Newman, M.J. Merrick, T.A. Radzio, K. Rock, T.T. Hammond, A. Righton and R.R. Swaisgood: San Diego Zoo Wildlife Alliance, Escondido, CA*

**A sequential bottom-up approach to restore desert tortoise (*Gopherus agassizii*) in the Orocopia mountains of Southern California**

*Luis E. Ramirez, Mary Thomas, Shane Bogner, Maya Nunez, and Nicole Ortega, and Emily L. Thomas: The Living Desert Zoo and Gardens, Palm Desert, CA*

**Cool air at night, tortoise delight: Validating iButtons for characterizing nighttime microhabitat use in juvenile desert tortoises (*Gopherus agassizii*) during a heatwave**

*Katelyn N. Rock, T.A. Radzio, T.T. Hammond, R.R. Swaisgood, and M.J. Merrick: San Diego Zoo Wildlife Alliance, Escondido, CA*

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