

Dena J. Clink, Ph.D.

Southeast Asia Team Lead

K. Lisa Yang Center for Conservation Bioacoustics

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EDUCATION

2017, University of California, Davis, Evolutionary Anthropology, Ph.D.

*Dissertation: The Evolutionary and Ecological Implications of Variation in Bornean Gibbon (*Hylobates muelleri*) Female Calls*

2009, Portland State University, Biology, M.S.

Thesis: The Effects of Experimental Phosphorus Enrichment on Florida Everglades Periphyton Pigment Signatures Analyzed Using High-performance Liquid Chromatography (HPLC)

2006, University of Puget Sound, Biology, B.S.

TECHNICAL SKILLS

Machine learning; Detection & classification; Digital signal processing; Bayesian statistical design & analysis; Big data organization & analysis; Data visualization; Management of project teams; Presentations to stakeholders, board members, and funding committees

PROFESSIONAL AND TEACHING POSITIONS

2021- present, *Research Associate: Southeast Asia Team Lead*, K. Lisa Yang Center for Conservation Bioacoustics

2021, *Associate Instructor*, Cornell University, Ithaca, NY, USA, Course: Neurobiology and Behavior I: Introduction to Behavior

2020- present, *Sound Analysis Workshop Instructor*, K. Lisa Yang Center for Conservation Bioacoustics, Cornell Lab of Ornithology, Cornell University, Ithaca, NY, USA. Course: Sound Analysis Workshop

2020, *Associate Instructor*, Cornell University, Ithaca, NY, USA, Course: Neurobiology and Behavior I: Introduction to Behavior

2018- 2021, *Postdoctoral Scientist*, K. Lisa Yang Center for Conservation Bioacoustics

2018, *ASEAN Fulbright U.S. Scholar*, Universiti of Malaysia, Sabah, & Universitas Sam Ratulangi, Indonesia
Project title: A comparative, inter-disciplinary approach to understanding the evolution of monogamy and duetting behavior in non-human primates.

2017, *Associate Instructor*, University of California, Davis, CA, USA, *Courses: Primate Evolutionary Ecology; Human Evolution*

2017, *Associate Instructor*, University of California, Davis, CA, USA, *Course: Introduction to Primatology*

2016, *Associate Instructor*, University of California, Davis, CA, USA, *Course: Primate Evolutionary Ecology*

2014-2015, *Fulbright Researcher*. Universiti of Malaysia, Sabah

Project title: Understanding the drivers of variation in territorial calls of Bornean gibbons.

2014-2015, *Research Fellow*, Institute for Tropical Biology and Conservation, University of Malaysia, Sabah, Malaysia

2011-2017, *Teaching Assistant*, University of California, Davis, CA, USA, *Courses*: Primate Socioecology, Human Evolutionary Biology, Behavioral and Evolutionary Biology of the Human Life Cycle

PUBLICATIONS (* indicates student advisee)

Clink, D. J., 2024. Isochronous rhythms: Facilitating song coordination across taxa?. *Current Biology*, 34(5), pp.R201-R203.

Lakdari, M.W.*, Ahmad, A.H., Sethi, S., Bohn, G.A. and **D.J. Clink**, 2024. Mel-frequency cepstral coefficients outperform embeddings from pre-trained convolutional neural networks under noisy conditions for discrimination tasks of individual gibbons. *Ecological Informatics*, 80, p.102457.

Adret, P., **Clink, D. J.** and S. Dolotovskaya. 2023. Duetting and turn-taking patterns of singing mammals: From genes to vocal plasticity, and beyond. *Frontiers in Ecology and Evolution*, 11, p.1279635.

Clink, D. J. (2023), Documenting the disappearance of primates from spaces where they once occurred. *Conservation Biolog.*, 37: e14140. <https://doi.org/10.1111/cobi.14140>

van Kuijk, S.M., O'Brien, S., **D.J. Clink.**, Blake, J.G. and A. Di Fiore. 2023. Automated detection and detection range of primate duets: a case study of the red titi monkey (*Plecturocebus discolor*) using passive acoustic monitoring. *Frontiers in Ecology and Evolution*, 11.

Vu, T.T., Doherty, P.F., T. Nguyen, H., **Clink, D. J.**, Nguyen, M.D., Dong, H.T., Cheyne, S.M., Giang, T.T., Phan, D.V., Ta, N.T. and D.V. Tran. 2023. Passive acoustic monitoring using smartphones reveals an alarming gibbon decline in a protected area in the central Annamite Mountains, Vietnam. *American Journal of Primatology*, 85(11), p.e23544.

D'Agostino, J. *, Spehar, S., Abdullah, A. & **D.J. Clink.** (2023). Variation in wild siamang (*Symphalangus syndactylus*) US-II phrases: further evidence of flexibility in a previously described stereotyped vocalization. <https://doi.org/10.1007/s10764-023-00384-5>.

Vu, T.T., Nguyen, T.C., Doherty Jr, P.F., Nguyen, H.T., **D.J. Clink**, Nguyen, M.D., Dong, H.T. and Giang, T.T., 2023. Using mobile smartphones and bioacoustics to monitor endangered bird species. *Ibis*, 165(4), pp.1368-1377.

Clink, D. J., Kier, I.A.*, Ahmad, A.H. & H. Klinck. (2023). A workflow for the automated detection and classification of female gibbon calls from long-term acoustic recordings. *Frontiers in Ecology and Evolution*. 11:1071640.

Kennedy, A.G. *, Ahmad, A.H., Klinck, H., Johnson, L.M. and **D.J. Clink**, 2023. Evidence for acoustic niche partitioning depends on the temporal scale in two sympatric Bornean hornbill species. *Biotropica*, 55(2), pp.517-528.

Comella, I.A.*, Tasirin, J.S., Klinck., H., Johnson, L.M. & **D.J. Clink.** (2022). Investigating note repertoires and acoustic tradeoffs in the duet contributions of a basal Haplorrhine primate. *Frontiers in Ecology and Evolution*. 10: 910121.

Lau, A.R. *, Zafar, M. *, Ahmad, A.H. & **D.J. Clink.** (2022). Investigating temporal coordination in the duet contributions of a pair-living small ape. *Behavioral Ecology and Sociobiology*. 76: 91.

Clink, D. J., Lau, A.R. *, Kanthaswamy, S., Johnson, L.M. & K.L. Bales. (2021). Limited evidence for kin signatures in the duet contributions of a South American primate. *Journal of Evolutionary Biology*. 35: 51-63.

- Clink, D. J.**, Zafar, M. *, Ahmad, A.H. & Lau, A.R. * (2021). Limited evidence for individual signatures or site-level patterns of variation in male Northern gray gibbon (*Hylobates funereus*) duet codas. *International Journal of Primatology*. 42: 896-914.
- Clink, D. J.**, Groves, T.*, Ahmad, A.H. & H. Klinck. (2021). Not by the light of the moon: investigating circadian rhythms and ecological predictors of calling in Bornean great argus. *PLOS ONE*. 16: e0246564.
- Clink, D. J.** & H. Klinck. (2021). Unsupervised acoustic classification of individual gibbon females and the implications for passive acoustic monitoring. *Methods in Ecology and Evolution*. 12: 328-341.
- Clink, D. J.** & A.R. Lau *. (2020). Adherence to Menzerath's Law is the exception (not the rule) in three duetting primate species. *Royal Society of Open Science*. 7: 201557.
- Sethi, S.S, Jones, N.S., Fulcher, B.D., Picinali, L., Bernard, H., **Clink, D. J.**, Klinck, H., Orme, C.D.L., Wrege, P., & R. Ewers. (2020). Characterizing soundscapes across diverse ecosystems using a universal acoustic feature set. *Proceedings of the National Academy of Sciences of the United States of America*. 117: 17049-17055.
- Lau, A.R. *, **Clink, D. J.** & K. L. Bales. (2020). Individuality in the vocalizations of adult and infant coppery titi monkeys (*Plecturocebus cupreus*). *American Journal of Primatology*. e23134.
- Clink, D. J.**, Ahmad, A.H. & H. Klinck. (2020). Brevity is not a universal in animal communication: evidence for compression depends on the unit of analysis in small ape vocalizations. *Royal Society of Open Science*. 7: 200151.
- Clink, D. J.**, Ahmad, A.H. & H. Klinck. (2020). Gibbons aren't singing in the rain: presence and amount of rainfall influences ape calling behavior in Sabah, Malaysia. *Scientific Reports*. 10: 1-13.
- Clink, D. J.**, Lau, A.R. * & K. L. Bales. (2019). Pulse rate and duration of pulse elements in titi monkey duets reflect caller age and pair-bond length. *Behaviour*. 1: 1-24.
- Clink, D. J.**, Tasirin, J.S. & H. Klinck. (2019). Vocal individuality and rhythm in male and female duet contributions of a nonhuman primate. *Current Zoology*. 0: 1-14.
- Lau, A.R. *, **Clink, D.J.**, Crofoot, M. C., & A.J. Marshall. (2018). Evidence for high variability in temporal features of male Bornean gibbon (*Hylobates muelleri*) codas. *International Journal of Primatology*. 39: 670-684.
- Clink, D. J.**, Grote, M.N., Crofoot, M. C., & A.J. Marshall. (2018). Understanding sources of variance and correlation among features of Bornean gibbon (*Hylobates muelleri*) female calls. *Journal of the Acoustical Society of America*. 142: 1-11
- Clink, D. J.**, Charif, R.A., Crofoot, M. C., & A.J. Marshall. (2018). Evidence for vocal performance constraints in a female non-human primate. *Animal Behaviour*. 141: 85-94.
- Clink, D. J.**, Crofoot, M. C., & A.J. Marshall. (2018). Application of a semi-automated vocal fingerprinting approach to monitor Bornean gibbon females in an experimentally fragmented landscape in Sabah, Malaysia. *Bioacoustics*. 1-17.
- Clink, D. J.**, Bernard, H., Crofoot, M. C., & A.J. Marshall. (2017). Investigating individual vocal signatures and small-scale patterns of geographic variation in female Bornean gibbon (*Hylobates muelleri*) great calls. *International Journal of Primatology*. 38: 656-671.
- Clink, D. J.**, Dillis, C., Feilen, K. L., Beaudrot, L., & A.J. Marshall. (2017). Dietary diversity, feeding selectivity, and responses to fruit scarcity of two sympatric Bornean primates (*Hylobates albibarbis* and *Presbytis rubicunda rubida*). *PLOS ONE*. 12: e0173369.
- Dillis, C., Beaudrot, L., Feilen, K.L., **Clink, D. J.**, Wittmer, H.U. & A.J. Marshall. (2015). Modeling the ecological and phenological predictors of fruit consumption by gibbons (*Hylobates albibarbis*). *Biotropica*. 47: 85-93.

BOOK CHAPTERS AND OTHER ARTICLES

Pavan, G., Budney, G., Klinck, H., Glotin, H., **Clink, D. J.** and J.A. Thomas. (2022): The history of sound recording, sensing, and analysis equipment. In: Jeanette Thomas, J. A., and Simmons, A. M. (eds.): Exploring Animal Behavior through Sound: Applications of Bioacoustical Studies.

Clink, D. J. (2021). What studying the songs of a distant primate relative can teach us about ourselves. *Frontiers for Young Minds*. 9:575984.

Caro, T., Charles, G.K., **Clink, D. J.**, Riggio, J., Weill, A.M. & C. Whitesell. (2016). Protected areas under threat. In: Sample, V.A., Bixler, R.P., Miller, C. (Eds.), *Forest Conservation in the Anthropocene: Science, Policy, and Practice*. The University Press of Colorado, Boulder, CO, pp. 83-98. <https://doi.org/10.5876/9781607324591.c006>.

PRE-PRINTS OR IN REVIEW (* indicates student advisee)

Clink, D. J. & H. Klinck. (2019). gibbonR: An R package for the detection and classification of acoustic signals using machine learning. arXiv, 1906.02572.

CONFERENCE PRESENTATIONS (* indicates student advisee)

Clink, D. J., Pelkie, C.R., Charif, R.A & H. Klinck. Passive acoustic monitoring of primates and their habitats: best practices and guidelines. Presented at: International Primatological Society Conference, January 2022, Quito, Ecuador.

Kennedy, A. *, Awad, R. *, Lakdari, W.*, Ahmad, A.H., Klinck, H. & **D.J. Clink**. Distinguishing helmeted hornbill vocalizations using unsupervised clustering techniques. Presented at: The Animal Behavior Live Virtual Conference, November 2021, USA.

Lau, A. R. *, **Clink, D. J.**, & Bales, K. L. (2021). Insight into the proximate mechanisms leading to variation in titi monkey (*Plecturocebus cupreus*) vocal duets. Presented at: American Society of Primatologists Conference, November 2021, USA.

Ross, W. *, Kaz, H.*, Madhusudhana, M., **Clink, D. J.** & W.M. Erb. An evaluation of vocal complexity in the long calls of Bornean orangutans. Presented at: The Animal Behavior Society Virtual Conference, August 2021, USA.

Bohn, G. *, Ahmad, A.H., H. Klinck & **D.J. Clink**. Environmental effects on transmission of individual signatures in Northern gray gibbon calls. Presented at: The Animal Behavior Society Virtual Conference, August 2021, USA.

Comella, I.A. *, Tasirin, J.S., H. Klinck & **D.J. Clink**. Applying human linguistic laws to Gursky's spectral tarsier (*Tarsius spectrumgurskyae*). Presented at: The Animal Behavior Society Virtual Conference, August 2021, USA.

Lau, A. R. *, **Clink, D. J.**, & Bales, K. L. (2021). Proximate mechanisms for variation in titi monkey (*Plecturocebus cupreus*) vocal duets. Presented at: Society for Behavioral Neuroendocrinology Virtual Conference, July 2021, USA.

Clink, D. J. & Kennedy, A. *. Acoustic niche partitioning of two sympatric Bornean hornbill species. Presented at: The Animal Behavior Society Twitter Conference, January 2021, USA.

Clink, D. J. Unsupervised acoustic classification of individual gibbon females. Presented at: BES Tropical & Conservation Ecology Twitter Conference: Advances in Technology and Innovative Methods, November 2020, UK.

Bhalla, A.S. *, Bohn, G. *, Kennedy, A. *, Ahmad, A.H., Klinck, H. & **D.J. Clink**. Use of bioacoustics techniques to study vocal behavior of threatened Southeast Asian vertebrates. Presented at: The Animal Behavior Society Virtual Conference, July 2020, USA.

Lau, A.R. *, **Clink, D. J.**, & K.L. Bales. (2019). Individuality in the vocalizations of adult and infant coppery titi monkeys (*Plecturocebus cupreus*). Presented at: The Acoustical Society of America Conference, December 2019, San Diego, CA.

Clink, D.J. & H. Klinck. A case study on Bornean gibbons highlights the challenges for incorporating individual identity into passive acoustic monitoring surveys. Presented at: The Acoustical Society of America Conference, December 2019, San Diego, CA.

Lau, A.R. *, **Clink, D. J.**, & K.L. Bales. (2019). Vocal individuality in two note types of the duet vocalizations of coppery titi monkeys (*Plecturocebus cupreus*). Presented at: The American Society of Primatologists Meeting, August 2019, Madison, WI.

Clink, D. J., Grote, M.N., Crofoot, M.C. & A.J. Marshall. A multivariate approach to investigating within-individual, between-individual and between-site variation in Bornean gibbon female great calls. Presented at: 4th International Symposium on Acoustic Communication by Animals, July 2017, Omaha, NE.

Clink, D. J., Crofoot, M.C., Bernard H. & A.J. Marshall. Utilizing vocal fingerprints to monitor Bornean gray gibbons (*Hylobates funereus*) at the Stability of Altered Forest Ecosystems project in Sabah, Malaysia. Presented at: Joint meeting of International Primatological Society and American Society of Primatologists, August 2016, Chicago, IL.

Juarez, C.P., **Clink, D.J.** & E. Fernandez-Duque. Demographic characterization of owl monkeys (*Aotus azari azari*) in gallery forests and forest islands of the Argentinean Chaco. Presented at: The American Society of Primatologists Meeting, September 2012, Sacramento, CA.

INVITED PRESENTATIONS

Clink, D. J. Using passive acoustic monitoring to provide insights into the vocal behavior of Bornean birds. Presented at: Learning Across Boundaries Seminar, December 2022, YALE-NUS Singapore (virtual).

Clink, D. J. Variasi Individual Suara Owa Borneo dan Konservasinya. Presented at: 'Festival Owa: Konservasi dan Seni' organized by Perhimpunan Ahli dan Pemerhati Primata Indonesia (Indonesian Primatologist Association), October 2021, Indonesia (virtual).

Clink, D. J. Machine learning approaches provide insights into behavior, ecology and conservation of nonhuman primates. Presented at: Universiti Teknologi MARA Seminar Series, August 2021, Malaysia (virtual).

Clink, D. J. Machine learning approaches provide insights into behavior, ecology and conservation of nonhuman primates. Presented at: Syracuse University Biology Seminar Series, April 2021, USA (virtual).

Clink, D. J. & H. Klinck. Acoustic monitoring of vocal Southeast Asian primates and their habitats: recent advances and challenges. Presented at: International Symposium on Tropical Forestry and Environmental Sciences Conference, September 2019, East Kalimantan, Indonesia.

Clink, D. J. Primate evolution, ecology and conservation through the lens of bioacoustics. Presented at: Sound Analysis Workshop, May 2019, Cornell University, Ithaca, NY.

Clink, D. J. Eavesdropping on Southeast Asian primates– What bioacoustics can teach us about primate evolution, ecology and conservation. Presented at: Anthropology Department Seminar, January 2019, University of Florida, Gainesville, FL.

Clink, D. J. Acoustic monitoring of vocal Southeast Asian primates and their habitats: recent advances and challenges. Presented at: Southeast Asian Biodiversity, Science Education and Humanity International Conference, May 2018, Banda Aceh, Indonesia.

GRANTS AND FELLOWSHIPS

2023- H. Elliot McClure Fund for the Research and Conservation of Birds in Asia (PI)- \$11,000 *Project: Co-developing a locally led investigation of migratory birds in the East Asian Flyway using acoustics.*

2022 - Anonymous donor (Co-PI) - \$300,000

Project: Kenyir for Life: Securing the Future of Forests, Biodiversity and People in the 200,000-Hectare Kenyir Watershed.

2021 - World Hope International (Co-PI) - \$100,000

Project: Increasing community conservation action for globally endangered yellow-cheeked crested gibbons by scaling up a community-owned enterprise in Cambodia.

2019 - TNC-Cornell Collaborative Research Grant (Postdoc)- \$61,463

Project: The next frontier in bioacoustics: Modeling sound attenuation and individual space usage to estimate density of animal populations.

2018 - Fulbright ASEAN U.S. Scholar Award (PI) - \$37,000

Project: A comparative, inter-disciplinary approach to understanding the evolution of monogamy and duetting behavior in non-human primates.

2016 - Mentoring at Critical Transitions (MCT) Wakeham Fellowship, UC Davis- \$2500

2016 - Crook Travel Award for participation in the International Primatological Society/American Society of Primatologists Meeting- \$300

2016 - SeaBASS Travel Award- \$500

2014 - Fulbright Student Researcher Scholarship (PI) - \$15,000

Project: Understanding the drivers of variation in territorial calls of Bornean gibbons.

2014 - American Society of Primatologists Grant (PI)- \$1000

Project: Utilizing vocal fingerprints to understand the impacts of experimental habitat fragmentation on Bornean gibbons.

2013 - UCD Summer Research Fellowship - \$3000

2013 - Cleveland Metroparks Zoo Grant (PI) - \$3100

Project: The influence of selective logging and habitat fragmentation on group density, demography and vocalizing behaviors of gibbons in Sabah, Malaysia.

2012 - UCD Summer Research Fellowship - \$4000

2012 - Primate Conservation Inc. Research Grant (PI) - \$3100

Project: Evolutionary, ecological and conservation implications for population- and individual-level variation in territorial calls of the Bornean gibbon.

WORKSHOPS

July 2022 (ongoing) - Organizer and contributor to Bioacoustics Equipment & Mentorship Award for Indonesian and Malaysian scientists. Link to call for proposals: <https://www.birds.cornell.edu/ccb/call-for-proposals-bioacoustics-equipment-mentorship-award/>

November 2021- Contributor to the 'Introductory seminar series on computer programs used in bioacoustics' organized by the University of Zürich. Talk titled: 'Using Raven for bioacoustic analysis'.

April 2021 - Organizer and contributor for the 'Virtual Sound Analysis Workshop' for participants in the Caribbean. Done in collaboration with the Anguilla National Trust.

January 2021 - Organizer and contributor for the 'Virtual Sound Analysis Workshop' for participants in Malaysia and Southeast Asia. Done in collaboration with the Malaysian Primatological Society.

September 2019 - Organizer and contributor for Conservation bioacoustics workshop at the Student Conference for Conservation Science, American Museum of Natural History, NY, USA.

PUBLIC OUTREACH

2022- Contributor to ‘Bioacoustics in Indonesia and Malaysia: Conservation in Action’. Link: <https://m.youtube.com/watch?v=3QXYF0m5Ksk&feature=youtu.be>

2021 - Contributor to ‘Exploring Nature Through Sound and Music: Tropical Oceans and Islands’.
Link: <https://academy.allaboutbirds.org/live-event/explore-nature-through-sound-and-music-tropical-islands-and-ocean/>

2020 - Animal Behavior Society Twitter Takeover.
Link: <https://twitter.com/AnimBehSociety/status/1308043636496576514?s=20>

2020- Contributor to Center for Conservation Bioacoustics Blog titled: “CCB in Southeast Asia: Gibbons, bioacoustics, and durian, oh my!”
Link: <https://www.birds.cornell.edu/ccb/ccb-in-southeast-asia-gibbons-bioacoustics-and-durian/>.

2019 - Contributor to the Mongabay podcast titled: “How listening to individual gibbons can benefit conservation.”
Link: <https://news.mongabay.com/2019/11/audio-how-listening-to-individual-gibbons-can-benefit-conservation/>

JOURNALS REFEREED

American Journal of Physical Anthropology; Folia Primatologica; Asian Primates; Scientific Reports; American Journal of Primatology; Acta Ethologica; Journal of the Acoustical Society of America

ACADEMIC SERVICE

Fall 2022- Member of the Rose Postdoctoral Fellowship selection committee at the Cornell Lab of Ornithology

Fall 2022 (ongoing) - Member of undergraduate affairs committee at the Cornell Lab of Ornithology

Summer 2022 - Mentor for the Copula Program

Winter 2022- Search committee for sound analysis workshop instructors for the K. Lisa Yang Center for Conservation Bioacoustics

Fall 2022 (ongoing) - Undergraduate research coordinator for the K. Lisa Yang Center for Conservation Bioacoustics

Fall 2021- Search committee for Raven programmer position for the K. Lisa Yang Center for Conservation Bioacoustics

Summer 2021- Mentor for the Copula Program

DISSERTATION COMMITTEE MEMBER

Justin D’Agostino, Southern Illinois University Carbondale, Defense date: May 2021

Silvy M Van Kuijk, University of Texas, Austin, Defense date: TBD

STUDENT MENTORING (mentorship resulted in a peer-reviewed publication* and/or conference presentation[†])

Current students:

2022- present: Jinsung Kim - Cornell University

2022- present: Hope Cross-Jaya - Cornell University
2021 - present: Walid Lakdari[†] - Elbilial International High school, Casablanca, Morocco
2021 - present: Rama Awad[†] - International High school, England
2021 - present: Nur Aoliya - IPB University, Indonesia
2021 - present: Ana Gabrielle Alcantara - University of the Philippines Diliman
2020 - present: Amy Kennedy^{*†} - Cornell University

Past students:

2020 - 2022: Isabel Comella^{*†} - Cornell University
2020 - 2021: Maryam Zafar^{*†} - Cornell University
2019 - 2021: Avni Bhalla[†] - Cornell University
2019 - 2021: Gabriel Bohn[†] - Cornell University
2015 - 2017: Crystal Sandmire - UC Davis
2015 - 2017: Tatiana Thomas - UC Davis
2014 - 2022: Allison Lau^{*†} - UC Davis