Matthew LH. Cheng

Phone: 603-408-7618 | Email: lhcheng@alaska.edu | Github: chengmatt

EDUCATION

University of Alaska Fairbanks, College of Fisheries and Ocean Sciences 2021 - Present
Ph.D, Fisheries Juneau, AK

University of Alaska Fairbanks, Department of Mathematics and Statistics 2021 - Present
Graduate Certificate, Statistics Juneau, AK

University of New Hampshire, College of Life Sciences and Agriculture 2017 - 2021
BS., Marine Estuarine and Freshwater Biology Durham, NH

PROFESSIONAL EXPERIENCE

University of Alaska Fairbanks
Graduate Research Assistant Aug 2021 - Present

- Developed standardized fishery-dependent abundance indices for Alaska sablefish by combining multiple data sources and gears utilizing Generalized Additive Models.
- Incorporated a new fishery fleet within the Alaska sablefish stock assessment model to address changes in fleet structure.
- Utilized a simulation estimation framework to formulate best practices for integrated age-structured stock assessment models when: 1) confronted with changes in fleet structure and differences in selectivity forms, and 2) considerations for modeling sex-specific dynamics.
- Contributed to the 2022 and 2023 Alaska sablefish stock assessment through the development of fishery-dependent abundance indices, model diagnostics, visualizations, and research oriented models.

University of New Hampshire
Field Technician Jun 2021 - Aug 2021

- Coordinated field logistics to evaluate the distribution of invasive knotweed and its potential impacts on stream macro-invertebrates and fishes.
- Conducted electrofishing surveys to capture stream fishes and mark-recapture experiments to understand mechanisms governing knotweed dispersal.

Research Mentor Jan 2021 - May 2021

- Developed methods for separating microplastics from regurgitated bird pellets.
- Trained, oversaw, and mentored two undergraduates in sample processing, statistical analyses using the R software, resulting in a poster presentation.

Research Technician May 2020 - May 2021

- Analyzed acoustic sonar videos from Chilko Lake, British Columbia to investigate predator-prey dynamics between bull trout and migrating sockeye salmon smolts.

Research Technician May 2019 - May 2021

- Designed physical and chemical methods for separating microplastics from sediment cores and quantified microplasticis via confocal microscopy.
- Collected zooplankton samples and investigated environmental factors influencing eastern oyster larval abundance.

USGS Northeast Climate Adaptation Science Center
Wildlife Intern Aug 2020 - May 2021

- Collated wildlife and snow data from camera traps into a central database and managed the database for data consistency and quality (Microsoft Access).

University of Delaware
NSF REU Intern July 2020

- In-person projects cancelled due to COVID-19, but relevant distance learning in topics such as scientific communication, current research at the University of Delaware, science ethics, technical writing, coding, and best practices for data visualization.

New Hampshire Community Seafood
Intern Jul 2019 - Dec 2020

- Solicited potential customers to join a community supported fishery program.
- Directed public outreach efforts on sourcing sustainable and local seafood, and fishery related topics.
- Engaged harvesters to coordinate and collaborate with academics on research projects.

PUBLICATIONS

Published Scholarly Works

1. **Cheng, M.LH**., Goethel, D.R., Cunningham, C.J., 2024. Addressing complex fleet structure in fishery stock assessment models: Accounting for a rapidly developing pot fishery for Alaska sablefish (Anoplopoma fimbria). **Fisheries Research** 271, 106917. https://doi.org/10.1016/j.fishres.2023.106917
2. Fitzgerald, K.A., Bellmore, R.J., Fellman, J.B., **Cheng, M.LH**., Delbecq, C.E., Falke, J.A. Stream hydrology and a pulse subsidy shape patterns of fish foraging **Journal of Animal Ecology**, https://doi.org/10.1111/1365-2656.14018
3. **Cheng, M.LH**., Thorson, J.T., Ianelli, J.N., Cunningham, C.J., Estimating age, year, and cohort effects in stock assessments: demonstration of a computationally efficient and reproducible framework **Fisheries Research**, 266. https://doi.org/10.1016/j.fishres.2023.106755
4. **Cheng, M.LH**., Rodgveller, C.J., Langan, J.A., Cunningham, C.J. (2023). Standardizing fishery-dependent catch-rate information across gears and data collection programs for Alaska sablefish (Anoplopoma fimbria). **ICES Journal of Marine Science**, fsad037. https://doi.org/10.1093/icesjms/fsad037
5. **Cheng, M.LH**., Hinch, S.G., Juanes, F., Healy, S.J., Lotto, A.G., Mapley, S. J., Furey, N.B. (2022). Acoustic Imaging Observes PredatorPrey Interactions between Bull Trout and Migrating Sockeye Salmon Smolts. **North American Journal of Fisheries Management**, nafm.10833. https://doi.org/10.1002/nafm.10833
6. Stasse, A., **Cheng, M.LH**, Meyer, K., Bumbera, N., Van Volkom, K., Laferriere, A. M., Dijkstra, J. A., Brown, B. (2022). Temporal Dynamics of Eastern Oyster Larval Abundance in Great Bay Estuary, New Hampshire. **Journal of Shellfish Research**, 40(3). https://doi.org/10.2983/035.040.0303
7. **Cheng, M.LH**., Lippmann, T.C., Dijkstra, J.A., Bradt, G., Cook, S., Choi, JG., Brown, B.L. (2021). A baseline for microplastic particle occurrence and distribution in Great Bay Estuary. **Marine Pollution Bulletin**, 170, 112653. https://doi.org/10.1016/j.marpolbul.2021.112653

Technical reports

1. Goethel, D.R., **Cheng, M.LH**., Echave, K.B., Marsh C., Rodgveller, C.J., Shotwell, S.K., Siwicke, K.A. 2023. Assessment of the Sablefish Stock in Alaska. 87.
2. Goethel, D.R., Rodgveller, C.J., Echave, K.B., Shotwell, S.K., Siwicke, K.A., Malecha, P.W., **Cheng, M**., Williams, M., Omori, K., and Lunsford, C.R. 2022. Assessment of the Sablefish Stock in Alaska. 182.

In review

1. Fitzgerald, K.A., Bellmore, R.J., Fellman, J.B., **Cheng, M.LH**., Boyles-Muehleck, N., Delbecq, C.E., Falke, J.A., Pink Salmon spawning abundance fluctuations impart biennial growth disparities to juvenile Coho Salmon in a southeast Alaska watershed *In review - Freshwater Biology*
2. Charpentier, J.E., Gunn, J.S., **Cheng, M.LH**., Licht, S., McCoy, J., Truscott, J., Furey, N.B., Invasive knotweed (Fallopia spp.) movement in a northern New Hampshire (USA) stream system *In review - Invasive Plant Science and Management*
3. **Cheng, M.LH**., Goethel, D.R., Hulson, PJ.F., Cunningham C.J., Confronting shifts in fishery fleet structure: Practical recommendations for integrated stock assessments *In review - Canadian Journal of Fisheries and Aquatic Sciences*

In preparation (Available upon request)

1. **Cheng, M.LH**., Goethel, D.R., Hulson, PJ.F., Cunningham C.J., Slim pickings?: Extreme recruitment events may confer density-dependent declines in growth for Alaska sablefish (Anoplopoma fimbria) with implications for stock assessment *Plan to submit to ICES Journal of Marine Science*

CONFERENCE PRESENTATIONS

***Presentation/poster award**

Goethel, D.R., Echave K., Lunsford C., Marsh C., Oke K., Shotwell K., Siwicke K., Cleaver S., **Cheng, M**., Spasming Sablefish: Unraveling the Quandary of a Climate Boon and Socioeconomic Swoon (2024) Lowell Wakefield Fisheries Symposium, *Oral Presentation*, Sitka AK

Cheng, M.LH., Goethel, D.R., Hulson, P.J., Cunningham C.J., Confronting changes in fishery fleet structure for stock assessments: Insights from Alaska sablefish and a simulation study" (2023) University of Washington SAFS Quantitative Seminar, *Oral Presentation*, Virtual

***Cheng, M.LH**., Goethel, D.R., Cunningham C.J., Incorporating dynamic fleet structure in stock assessment models: Accounting for a rapidly developing pot fishery for Alaska sablefish (Anoplopoma fimbria)" (2023) Western Groundfish Conference, *Oral Presentation*, Juneau AK

***Cheng, M.LH**., Goethel, D.R., Cunningham C.J., Incorporating dynamic fleet structure in stock assessment models: Accounting for a rapidly developing pot fishery for Alaska sablefish (Anoplopoma fimbria)" (2023) 49th Annual American Fisheries Society Alaska Chapter Meeting, *Oral Presentation*, Fairbanks AK

*Muehleck, N., Fitzgerald K.A., **Cheng, M.LH**., Bellmore, J.R., Fellman, J.B., Falke, J.A., "Juvenile Coho Salmon growth patterns track biennial Pink Salmon spawning abundance fluctuations in a southeast Alaska watershed" (2023) 49th Annual American Fisheries Society Alaska Chapter Meeting, *Poster Presentation*, Fairbanks AK

***Cheng, M.LH**., Thorson, J.T., Ianelli, J.N., Cunningham C.J., "Unlocking the triad of age, year, and cohort effects in stock assessment: a proof-of-concept study" (2023) 26th Annual American Fisheries Society Student Symposium (UAF CFOS), *Oral Presentation*, Juneau AK

Cheng M.LH., Rodgveller CJ, Langan JA, Cunningham CJ, Development of Fishery-dependent Abundance Indices for Alaska Sablefish (Anoplopoma fimbria) (2022) 152nd Annual American Fisheries Society Meeting, *Oral Presentation*, Spokane WA

***Cheng M.LH**., Rodgveller CJ, Cunningham CJ, Development of Fishery-dependent Abundance Indices for Alaska Sablefish (Anoplopoma fimbria) (2022) 25th Annual American Fisheries Society Student Symposium (UAF CFOS), *Oral Presentation*, Juneau AK

Cheng M.LH., Rodgveller CJ, Cunningham CJ, Development of Fishery-dependent Abundance Indices for Alaska Sablefish (Anoplopoma fimbria) (2022) 48th Annual American Fisheries Society Alaska Chapter Meeting, *Oral Presentation*, Virtual

Stasse. A, Meyer. K, **Cheng M.LH**., Brown BL. Evaluation of Oyster Larval Abundance in the Great Bay Estuary (2022) Aquaculture, *Poster Presentation*, San Diego CA

Cheng M.LH., Lippmann TC, Dijkstra JA, Bradt G, Cook S, Choi JG, Brown BL. A deposition baseline for microplastic particle distribution in an estuary (2021) College of Life Sciences and Agriculture Undergraduate Research Conference, *Oral Presentation*, Virtual

Cheng M.LH., Mapley SJ, Lotto AG, Hinch SG, Juanes F, Furey NB. Assessing predator-prey interactions between migrating juvenile sockeye salmon smolts and bull trout in British Columbia (2021) College of Life Sciences and Agriculture Undergraduate Research Conference, *Poster Presentation*, Virtual

Stasse. A, Meyer. K,**Cheng M.LH**., Brown BL. Evaluation of Oyster Larval Abundance in the Great Bay Estuary. (2021) New Hampshire Sea Grant Symposium, *Poster Presentation*, Virtual

*McDowell L, Wardinski C, **Cheng M.LH**., Caldwell AE, Craig, E. Evaluating regurgitated pellets as indicators of microplastic ingestion by NH-breeding seabirds. (2021) College of Life Sciences and Agriculture Undergraduate Research Conference, *Poster Presentation*, Virtual

Brammer D, **Cheng M.LH**., Derrick. M, Dunn. T, Orzech. E Vajda. Z. Monitoring of Temperature in the Benthic Zone of the Gulf of Maine and Assessment of the Effects of Temperature on Disease Incidence of *Strongylocentrotus droebachiensis* and *Henricia sanguinolenta*. (2020) College of Life Sciences and Agriculture Undergraduate Research Conference, *Poster Presentation*, Virtual

TECHNICAL PRESENTATIONS

Cheng M.LH., Goethel, DR., Cunningham CJ., Exploring alternative parameterizations to account for the emerging pot gear fleet in the sablefish stock assessment. (2023) September Groundfish Plan Team Meeting, Seattle WA

Cheng M.LH., Rodgveller CJ., Langan JA., Goethel, DR., Cunningham CJ., Standardizing sablefish catch-per-unit-effort (CPUE) across gear types and data sources. (2022) September Groundfish Plan Team Meeting, Seattle WA

Cheng M.LH., Rodgveller CJ., Cunningham CJ., Development of Fishery-dependent Abundance Indices for Alaska Sablefish (Anoplopoma fimbria). (2022) NOAA CPUE Discussion Group

TEACHING

University of Alaska Fairbanks NSF GRFP Workshop
Workshop Lead Fall 2022, Fall 2023

- Developed a workshop covering application components for the NSF GRFP to develop a fellowship application (Fall 2022: 2 awards, 1 Honorable Mention; Fall 2023: 1 award).

University of Alaska Southeast Biology Seminar (BIOL 492)
Guest Lecturer Spring 2022

- Presented a lecture on predator-prey interactions between sockeye smolts and bull trout, and catch-per-unit-effort standardization methods.

University of Alaska Fairbanks NSF Tamamta Graduate Fellowship
Teaching assistant Fall 2021

- Provided personalized tutoring for graduate students(s) taking Calculus I.

University of New Hampshire General Ecology (BIOL 541)
Teaching Assistant Spring 2020

- Assisted with lab and field instruction, and engaged students in basic ecological concepts

SERVICE

***Journal Referee*:** Journal of Fish and Wildlife Management (n = 1)
Western Groundfish Conference, Juneau AK, Volunteer (2023)
University of Alaska Fairbanks Justice, Equity, Diversity, and Inclusion Committee (2021 - 2022)
University of Alaska Fairbanks Student Wellbeing Committee (2021 - 2022)
Alaska American Fisheries Society Student Symposium Organizer (2021 - 2023)
Executive Member of Lambda Chi Alpha Fraternity

AWARDS, GRANTS, AND HONORS

2024 Alaska EPSCoR NSF Travel Award ($2800)
2023 2023 Western Groundfish Conference, Best Presentation ($300)
2023 Alaska EPSCoR NSF Travel Award ($1000)
2023 49th Annual American Fisheries Society Alaska Chapter Meeting, Best PhD Oral Presentation ($450)
2023 Alaska American Fisheries Society Student Symposium, Runner Up for Best Short Talk
2023 Alaska Chapter American Fisheries Society Travel Award ($1300)
2022 American Fisheries Society Marine Fisheries Section Student Travel Award ($500)
2022 Alaska EPSCoR NSF Travel Award ($2500)
2022 National Science Foundation Graduate Research Fellowship Program (Award offered; $147,000)
2022 Alaska American Fisheries Society Student Symposium Best Long Talk ($100)
2021 National Science Foundation Graduate Research Fellowship Program (Honorable Mention)
2019 University of New Hampshire Rutman Scholars Initiative ($1500)
2019 University of New Hampshire John and Katharyn Williams Scholarship ($3500)

RELEVANT COURSEWORK

Workshops: General Model for Assessing Crustacean Stocks (GMACS) workshop
University of Alaska Fairbanks: Statistical Computing in R, Regression and Analysis of Variance, Estimation of Fish Abundance, Bayesian Decision Theory for Resource Management, Ecosystem-based Fisheries Management, Time Series, Quantitative Population Dynamics, Modern Applied Statistics for Fisheries *(Informal audit)*, Statistical Theory I
University of New Hampshire: Quantitative Ecology, Experimental Design and Analysis, Introduction to the R Software, Physiology of Fishes, Sharks and Bony Fishes (Ichthyology), Fisheries Biology, Sustainable Marine Fisheries, Biological Oceanography, Ecology and Marine Environment, Introduction to Aquatic Botany, Evolution, Field Studies in Lake Ecology, General Ecology, Applied Biostatistics I, Calculus I

SKILLS

At-Sea Experience:

* Volunteer scientist, NOAA Sablefish Longline Survey, Dutch Harbor to Kodiak, AK (6/12/23 - 7/1/23)
* Volunteer scientist, NOAA Sablefish Longline Survey, Yakutat to Seward, AK (7/17/22 - 8/3/22)

Programming languages: R, LATEX, ADMB, TMB
Statistical methods: regression methods, maximum likelihood estimation, time series, Bayesian statistics, non-linear models, sex-and age-structured models, integrated analysis