UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

APR 2 0 2017

Chris Oliver
Executive Director
North Pacific Fishery Management Council
Suite 306
Anchorage, Alaska 99501

Dear Chris:

The Office of Science and Technology recommends Dr. Teresa A'mar for an appointment to the Gulf of Alaska (GOA) Groundfish Plan Team for one year starting in September 2017. As an Operations Research Analyst, Dr. A'mar uses statistical analysis and simulations to analyze and solve problems and improve decision-making. She provides technical support, as well as communication and outreach, for the design, development, and release of the Stock Synthesis assessment model. She is one of three members of the National Stock Assessment Program's modeling team, which focuses on the quantitative tools used to conduct stock assessments and provides a professional software development service for NOAA Fisheries. She also conducts research activities related to stock assessments, such as management strategy evaluation (MSE) projects with the Northwest Fisheries Science Center, the Alaska Fisheries Science Center, and other institutions.

Dr. A'mar also is a key contributor in the development of standards and best practices for production-level software development in NOAA Fisheries, assists with the management and oversight of the NOAA Fisheries toolbox; participates in the consulting, outreach, and mentoring of developers supporting new and existing toolbox applications; and participates in the development of new assessment methods, e.g., Metapopulation Assessment System (MAS). She serves on the agency's Assessment Methods Working Group and Management Strategy Evaluation Working Group.

Following the successful one-year membership of Dr. Patrick Lynch on the GOA Plan Team, we appreciate having another opportunity for Office of Science and Technology, stock assessment staff to serve on the Plan Team to enhance the professional development of NMFS' stock assessment scientists and to fill a vital need for additional modeling expertise on the team. You may recall past contributions by Dr. A'mar as the lead author of the GOA Pacific cod and northern and southern rock sole SAFE chapters, and the GOA walleye pollock MSE. Her CV is attached for your consideration.

Sincerely,

Dr. Ned Cyr
Director,
Office of Science and Technology

cc: Dr. Cisco Werner, Chief Scientist
    Dr. Doug DeMaster, Alaska Fisheries Science Center Director
    Dr. James Balsiger, Alaska Regional Administrator

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Z. Teresa A'mar

Education

PhD in Quantitative Ecology and Resource Management, University of Washington, Seattle, WA
Thesis: "A Management Strategy Evaluation of the harvest policies of the North Pacific Fishery Management Council used for the fishery for walleye pollock (*Theragra chalcogramma*) in the Gulf of Alaska"

MS in Quantitative Ecology and Resource Management, University of Washington, Seattle, WA
Thesis: "Quantifying Error and Uncertainty in Fishery Stock Assessment Models"

BS in Applied Mathematics, California Institute of Technology, Pasadena, CA

Experience

NOAA, National Marine Fisheries Service, 10/2009 – present, Operations Research Analyst
As the National Scientific Modeler in the Office of Science and Technology, responsibilities include:
- designing and developing , and providing technical support for, Stock Synthesis (SS), a general statistical catch-at-age population dynamics fisheries stock assessment modeling application developed by NOAA Fisheries (http://nft.nefsc.noaa.gov/SS3.html);
- contributing to user documentation, providing user support, and managing web content for SS through the NOAA VLab SS website (https://vlab.ncep.noaa.gov/group/stock-synthesis);
- collaborating with scientists at NOAA and other organizations on research projects for stock assessment, simulation testing, and management strategy evaluation (MSE), including designing and developing applications in C++, R, and Java, and contributing to peer-reviewed manuscripts and other documents (e.g., https://github.com/amart/ATL_goa_wp); and
- participating in the NOAA Fisheries Assessment Methods and Management Strategy Evaluation working groups, and related workshops, meetings, and conferences.

As a Stock Assessment Scientist at the Alaska Fisheries Science Center (AFSC), responsibilities included:
- conducting annual stock assessments for the Gulf of Alaska Pacific cod and Gulf of Alaska northern and southern rock sole stocks, including compiling and maintaining current information on the stocks, exploring statistical and analytical methods to improve the stock assessment models, and preparing the annual stock assessment fishery evaluation reports;
- participating in the AFSC/North Pacific Fisheries Management Council (NPFMC) stock assessment review process;
- analyzing the biology, population dynamics, and ecological relationships of the Gulf of Alaska walleye pollock and Gulf of Alaska Pacific cod stocks to include in the design and development of statistical modeling simulation testing frameworks in C++ and R to perform management strategy evaluations (MSEs) on current and alternative fisheries harvest control rules under changing climate conditions, and analyzing and interpreting the MSE results; and
- collaborating with scientists at NOAA and other organizations on research projects for stock assessment, simulation testing, and management strategy evaluation (MSE), including developing applications in C++ and R (e.g., https://github.com/amart/ss-sims).

University of Washington, 04/2009 – 10/2009, Post-doctoral Research Associate

Responsibilities included:

- designing and developing a statistical age-structured population dynamics modeling simulation testing framework with C++ and R for performing a MSE on the current and alternative management strategies for the Gulf of Alaska Pacific cod stock which incorporated error, uncertainty, alternate hypotheses, proxies for ecosystem shifts and multi-species interactions, and climate variability and regime shifts, and analyzing and interpreting the MSE results; and
- preparing written scientific and technical reports on research progress, and presenting results at workshops, conferences, and meetings related to statistics, ecological modeling, fisheries stock assessment, and fisheries management.

University of Washington, 09/2001 – 03/2009, Graduate Research Assistant

In the Punt laboratory in the School of Aquatic and Fisheries Sciences (SAFS), responsibilities included:

- designing and developing a statistical age-structured population dynamics modeling simulation testing framework with C++ and R for performing a MSE on the current and alternative management strategies for the Gulf of Alaska walleye pollock stock which incorporate error, uncertainty, alternate hypotheses, and proxies for ecosystem shifts and multi-species interactions, and climate variability and regime shifts (https://github.com/amart/mse), and analyzing and interpreting the MSE results;
- designing and developing a statistical modeling framework with C++ and R for evaluating and comparing the performance of model selection criteria, AIC, BIC, and DIC;
- preparing written scientific and technical reports on research progress, and presenting research results at workshops, conferences, and meetings;
- assisting AFSC stock assessment scientists with data compilation, model development, and documentation for Gulf of Alaska single-species groundfish stock assessment and fishery evaluation reports, and participating in the AFSC/NPFMC stock assessment review process; and
- organizing topics and speakers for the University of Washington SAFS fisheries stock assessment workshops for the 2006-2007 academic year.

ATL, Philips Medical Systems, 03/1998 – 09/2001, Software engineer

Responsibilities included:

- designing and developing applications and tools in Java and C for analyzing acoustic and thermal properties of ultrasound systems and scanheads;
- designing and developing software applications in Fortran and Java for the simulation of scanhead pressure waveform propagation through water to estimate acoustic output for meeting FDA and IEC standards requirements;
- writing software design and user documentation;
- assisting laboratory technicians with data collection and analysis; and
- assisting in the software, hardware, operating system, and networking maintenance of department computers.

MAJIQ, 07/1995 – 02/1998, Software engineer

Responsibilities included:

- designing, developing, testing, installing, and monitoring systems and user interface software enhancements, upgrades, and revisions for site-specific Production Management and Information System software and hardware for multiple client sites using PL/I and PostScript;

- tracking help desk call issues, client site ISAM databases, systems, software, hardware, and peripherals, installations, changes, and performance;
- writing design specifications, general and site-specific user documentation, and system enhancement and functionality upgrade quotes for software and hardware installations; and
- prioritizing and scheduling customer requests, bug reports and resolutions, and software and system versions.

SAIC, 10/1992 – 06/1995, Software engineer
In the ESG division, responsibilities included:
- designing, developing, testing, and integrating a graphical user interface and system functions to interface with Oracle database and Sun SPARCstation peripherals for the US Navy's EHF Communications Controller project using C and SQL; and
- using embedded SQL, C, and GOTS mapserver to display detailed database information and resource relationships on maps.

In the Commercial Solutions Division, responsibilities included:
- designing, enhancing, developing, and testing of OS/2, C, and embedded SQL code on the IBM PS/2 platform for managing communication, messaging, and file transfers between an IBM mainframe and portable IBM PCs for the RoadRider transportation industry project;
- providing software implementation, integration, and testing support and software issue tracking and resolution; and
- writing and editing product specifications, user guides, and instructor and student manuals.

Select peer-reviewed publications and technical reports

Schindler, D.E., Jankowski, K., A'mar, Z.T., Holtgrieve, G.W. 2017, in press. Two-stage metabolism inferred from diel oxygen dynamics in aquatic ecosystems. Ecosphere.

A'mar, T. and Palsson, W. 2015. Assessment of the Pacific cod stock in the Gulf of Alaska. In: Plan Team for Groundfish Fisheries of the Gulf of Alaska (editor), Stock Assessment and Fishery Evaluation Report for the Groundfish Resources of the Gulf of Alaska as Projected for 2016. Chapter 2. North Pacific Fishery Management Council, Anchorage, AK 99501. p. 173-296.
http://www.afsc.noaa.gov/REFM/Docs/2015/GOApcod.pdf

Van Kirk, K.F., Quinn, T.J., Collie, J.S., and A'mar, Z.T. 2015. Assessing uncertainty in a multispecies age-structured assessment framework: the effects of data limitations and model assumptions. Natural Resource Modeling, 28: 184-205. http://doi.org/10.1111/nrm.12063

Punt, A. E., A'mar, T., Bond, N. A., Butterworth, D. S., de Moor, C. L., De Oliveira, J. A. A., Haltuch, M. A., Hollowed, A. B., and Szuwalski, C. 2013. Fisheries management under climate and environmental uncertainty: control rules and performance simulation. ICES Journal of Marine Science. http://doi.org/10.1093/icesjms/fst057

Van Kirk, K.F., T.J. Quinn II, J.S. Collie, and Z.T. A'mar. 2012. Multispecies Age-Structured Assessment for Groundfish and Sea Lions in Alaska. In: G.H. Kruse, H.I. Browman, K.L. Cochrane, D. Evans, G.S. Jamieson, P.A. Livingston, D. Woodby, and C.I. Zhang, editors. Proceedings of the 26th

Lowell Wakefield Symposium: Global Progress in Ecosystem-Based Fisheries Management. Alaska Sea Grant College Program, University of Alaska Fairbanks, AK. http://doi.org/10.4027/gpebfm.2012

A'mar, T., Martin, M., and Palsson, W. 2012. Assessment of the northern and southern rock sole (*Lepidopsetta polyxystra* and *bilineata*) stocks in the Gulf of Alaska for 2013 In: Plan Team for Groundfish Fisheries of the Gulf of Alaska (editor), Stock Assessment and Fishery Evaluation Report for the Groundfish Resources of the Gulf of Alaska as Projected for 2013. Chapter 4.1. North Pacific Fishery Management Council, Anchorage, AK 99501. p. 437-534 http://www.afsc.noaa.gov/REFM/Docs/2012/GOAnsrocksole.pdf

A'mar, Z.T., A.E. Punt, and M.W. Dorn. 2010. Incorporating ecosystem forcing through predation into a Management Strategy Evaluation for the Gulf of Alaska walleye pollock (*Theragra chalcogramma*) fishery. Fisheries Research, 102(1-2): 98-114. http://doi.org/10.1016/j.fishres.2009.10.014

A'mar, Z.T. 2010. Appendix to the assessment of the shallow-water flatfish stocks in the Gulf of Alaska: Stock assessment model specification for the Gulf of Alaska northern and southern rock sole (*Lepidopsetta polyxystra* and *bilineata*) stocks. In: Plan Team for Groundfish Fisheries of the Gulf of Alaska (compiler), Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska, North Pacific Fishery Management Council, Anchorage, AK 99501. p. 471-494. http://www.afsc.noaa.gov/REFM/docs/2010/GOAshallowflat.pdf

Holtgrieve, G.W., Schindler, D.E., Branch, T.A., and A'mar, Z.T. 2010. Simultaneous quantification of aquatic ecosystem metabolism and re-aeration using a Bayesian statistical model of oxygen dynamics. Limnology and Oceanography, 55(3): 1047-1063. http://doi.org/10.4319/lo.2010.55.3.1047

A'mar, Z.T., Punt, A.E., and Dorn, M.W. 2009. The evaluation of two management strategies for the Gulf of Alaska walleye pollock fishery under climate change. ICES Journal of Marine Science, 66: 1614-1632. http://doi.org/10.1093/icesjms/fsp044

A'mar, Z.T. 2009. "A Management Strategy Evaluation of the harvest policies of the North Pacific Fishery Management Council used for the fishery for walleye pollock (*Theragra chalcogramma*) in the Gulf of Alaska", PhD Thesis. 257pp. University of Washington, Seattle, WA 98195

A'mar, Z.T., Punt, A.E., and Dorn, M.W. 2008. The Management Strategy Evaluation Approach and the Fishery for Walleye Pollock in the Gulf of Alaska. Pages 317-346. In: G.H. Kruse, K. Drinkwater, J.N. Ianelli, J.S. Link, D.L. Stram, V. Wespestad, and D. Woodby, editors. Proceedings of 24th Lowell Wakefield Fisheries Symposium: Resiliency of gadid stocks to fishing and climate change. Alaska Sea Grant College Program, University of Alaska Fairbanks, AK. http://doi.org/10.1093/icesjms/fsp044

A'mar, Z.T. and Punt, A.E. 2005. Minimum Stock Size Thresholds: How well can we detect whether stocks are below them? Pages 487-505. In: G. Kruse, V. F. Gallucci, D. E. Hay, R. I. Perry, R. M. Peterman, T. C. Shirley, P. D. Spencer, B. Wilson, and D. Woodby, editors. Proceedings of 21st Lowell Wakefield Fisheries Symposium: Assessment and management of new and developed fisheries in data-limited situations. Alaska Sea Grant College Program, University of Alaska Fairbanks, AK. http://doi.org/10.4027/famdls.2005

A'mar, Z.T. 2004. "Quantifying Error and Uncertainty in Fishery Stock Assessment Models", MS Thesis. 108pp. University of Washington, Seattle, WA 98195