

TOM F. NEISER

General Atomics, 3550 General Atomics Court, San Diego, CA 92121

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EDUCATION AND EMPLOYMENT

General Atomics (GA) Research Scientist (manager: Orso Meneghini)	Sep 2021 - present
GA/Oak Ridge Associated Universities (ORAU) Postdoctoral Scholar (advisor: Orso Meneghini)	Aug 2019 - Sep 2021
University of California, Los Angeles (UCLA) Ph.D. in Physics (advisors: Troy Carter and Frank Jenko)	Dec 2014 - Jul 2019
University of California, Los Angeles (UCLA) M.S. in Physics	2011 - 2014
Imperial College London B.S. & Associateship of the Royal College of Science in Physics with Theoretical Physics (2:1 Upper second-class honors)	2008 - 2011
SCECGS Redlands International Baccalaureate (45 points, top 0.05% in Australian Tertiary Admission Rank ; valedict.)	2006 - 2007

EXPERIENCE

General Atomics/ORAU <i>Postdoctoral Scholar & Scientist III</i>	Aug 2019 - present <i>San Diego, CA</i>
<ul style="list-style-type: none">· Curated a large database of experimental profiles and power balance analyses of DIII-D and MAST-U plasmas using automated workflows in OMFIT· Validated TGLF saturation rules - SAT0, SAT1, SAT2, SAT3- and identified strengths and weaknesses· Applied machine learning tools to help direct future saturation rule development· Advisors and collaborators: O. Meneghini, S.P. Smith, G.M. Staebler, J. Candy	
UCLA <i>Graduate Student Researcher</i>	Dec 2014 - Jun 2019 <i>Los Angeles, CA</i>
<ul style="list-style-type: none">· Characterized electron-scale and ion-scale turbulence and their multi-scale interactions in the near-edge of DIII-D L-mode plasmas using the gyrokinetic turbulence code GENE (www.genecode.org)· Used HPC facilities at NERSC (30 MCPUh); Python, Mathematica and IDL for data processing· Advisors: Prof.'s Frank Jenko and Troy Carter	
UCLA <i>Teaching Assistant</i>	Sep 2011 - Jun 2016 <i>Los Angeles, CA</i>
<ul style="list-style-type: none">· Comprehensive exam discussion sections for graduate students (started wiki: www.physwiki.com/w)· Discussion Sections: Physics for Scientists & Engineers, Plasma Electronics, Astronomy· Laboratory Sections: Physics for Life Scientists	
Imperial College London <i>Research Student</i>	Oct 2010 - Jan 2011 <i>London, UK</i>
<ul style="list-style-type: none">· Bachelor project on improving fusion reactors with Hydrogen doping· Carried out numerical integration of the plasma dispersion function using C++· Advisor: Prof. Steve Cowley	

TECHNICAL STRENGTHS

Computer Languages Python, Mathematica, Julia, IDL, C++, Fortran, Bash
Languages English (fluent), German (fluent)

SEMINARS

MAST-U Science Meeting (Nov, 2022)
DIII-D Science Meeting, General Atomics, San Diego, CA (Dec 11th, 2020)
APS DPP Student Day, Ft. Lauderdale, FL (2019)
Princeton Plasma Physics Laboratory, Princeton, NJ (2019)
Lawrence Livermore National Laboratory, Livermore, CA (2019)
DIII-D National Fusion Facility, General Atomics, San Diego, CA (2018)
Plasma Science and Technology Institute, University of California, Los Angeles, CA (2015)

PROFESSIONAL DEVELOPMENT

Computational Physics School for Fusion Research, Massachusetts Institute of Technology (2019)
Preparing Future Faculty Class (2018 - 2019)
Machine Learning Reading Group (2018 - 2019)
Teaching Assistant Training Program (2012)

MENTORSHIP

SULI mentor (Fall 2023)
SULI mentor of Joseph Hall (Summer 2022)
Co-mentoring with S.P. Smith and O. Meneghini of GA intern A. Eubanks (2020-2021)
Turbulent Transport Journal Group (6 grad students/year, 2020 - 2021)
APS Bridge Mentor (1 grad student/year, 2018 - 2019)
Comprehensive Exam mentor for first year graduate students (25 grad students/year, 2014 - 2019)
Graduate Student Mentorship Program (1-2 grad students/year, 2015 - 2019)

AWARDS AND HONORS

3rd Place Poster award at Transport Task Force Meeting, San Diego (2018)
Honorable mention in NSF Graduate Research Fellowship Program (2011)

REFERENCES

Orso Meneghini (meneghini@fusion.gat.com)
Frank Jenko (jenko@physics.ucla.edu)
Troy Carter (tcarter@physics.ucla.edu)

Papers

Reduced transport model development informed by machine learning tools, **T.F. Neiser**, A. Eubanks, O. Meneghini, S.P. Smith, M. Fasciana, G.M. Staebler, J. Candy, PPCF, paper in preparation (2023).

Big data validation of the TGLF saturation rules, **T.F. Neiser**, O. Meneghini, S.P. Smith, M. Fasciana, J.B. Hall, A. Eubanks, G.M. Staebler, E. Belli, J. Candy, *Phys. Plasmas*, paper in preparation (2023).

Gyrokinetic simulations of turbulence in the near-edge of fusion plasmas, **T.F. Neiser**, PhD Thesis, UCLA (2019) Permalink: <https://escholarship.org/uc/item/4x3429g9>

Gyrokinetic GENE simulations of DIII-D near-edge L-mode plasmas, **T.F. Neiser**, F. Jenko, T. A. Carter, L. Schmitz, D. Told, G. Merlo, A. Bañón Navarro, P. C. Crandall, G. McKee and Z. Yan., *Phys. Plasmas* **26**, 092510 (2019). doi: [10.1063/1.5052047](https://doi.org/10.1063/1.5052047)

Fermi Degenerate Antineutrino Star Model of Dark Energy, **T.F. Neiser**. *Adv. Astron.* **2020**, 8654307 (2020). doi: [10.1155/2020/8654307](https://doi.org/10.1155/2020/8654307)

Invited Talks

Directing development of reduced models of turbulent transport in fusion plasmas with machine learning tools, **T.F. Neiser**, O. Meneghini, S.P. Smith, A. Eubanks, M. Fasciana, G.M. Staebler, J. Candy, [33rd IUPAP Conference on Computational Physics](#) (Aug 2022).

Contributed Talks

Update on the TGLF and CGYRO neural network surrogates, **T.F. Neiser**, O. Meneghini, T. Slendebroek, J. McClenaghan, S.P. Smith, D. Orozco, B. Sammuli, G. Staebler, J.B. Hall, E. Belli, J. Candy, 30th Meeting of the ITPA Transport and Confinement Group (April 2023).

Recent results from the big data approach to validating TGLF, **T.F. Neiser**, O. Meneghini, S.P. Smith, A. Eubanks, G. Staebler, J. Candy, 28th Meeting of the ITPA Transport and Confinement Group (March 2022).

Reduced transport model development informed by machine learning tools, **T.F. Neiser**, et al., 4th IAEA Technical Meeting on Fusion Data Processing, Validation and Analysis (Dec 2021, [link](#)).

Big data validation of the TGLF saturation rules, **T.F. Neiser**, O. Meneghini, S.P. Smith, A. Eubanks, M. Fasciana, G. M. Staebler, J. Candy, U.S. Transport Task Force Meeting (April 2021).

TGLF validation with a large-scale power balance database, **T.F. Neiser**, O. Meneghini, S. P. Smith, A. Eubanks, G. Staebler, J. Candy, 26th Meeting of the ITPA Transport and Confinement Group (March 2021).

Big Data Validation of the TGLF Transport Model, **T.F. Neiser**, O. Meneghini, S. P. Smith, M. Fasciana, G. Staebler, J. Candy, 62nd Meeting of the APS Division of Plasma Physics (DPP) (2020). Bibcode: [2020APS..DPPZ04007N](#)

Gyrokinetic simulations of DIII-D near-edge L-mode plasmas, **T.F. Neiser**, F. Jenko, T. Carter, L. Schmitz, G. Merlo, D. Told, A. Bañón Navarro, G. McKee and Z. Yan, 59th Meeting of the APS DPP (2017). Bibcode: [2017APS..DPPYO4008N](#)

Multi-scale Simulations of DIII-D near-edge L-mode plasmas, **T.F. Neiser**, F. Jenko, T. Carter, L. Schmitz, D. Told, A. Bañón Navarro, G. McKee and Z. Yan, 58th Meeting of the APS DPP (2016). Bibcode: [2016APS..DPPTO9011N](#)

ETG-dominated transport regimes in near-edge DIII-D L-mode plasmas: Validation of multiscale gyrokinetic simulations, **T.F. Neiser**, F. Jenko, L. Schmitz, D. Told, A. Bañón Navarro, T. Carter, Z. Yan and G. McKee, 57th Meeting of the APS DPP (2015). Bibcode: [2015APS..DPPUO5011N](#)

Contributed Posters

Benchmarking of a retrained TGLF-NN, **T.F. Neiser**, O. Meneghini, T. Slendebroek, J. McClenaghan, S.P. Smith, D. Orozco, B. Sammuli, G.M. Staebler, J. Hall, E. Belli, J. Candy, U.S. Transport Task Force Meeting (May 2023).

Database generation for validation of TGLF and retraining of neural network accelerated TGLF-NN, **T.F. Neiser**, O. Meneghini, S.P. Smith, J. McClenaghan, D. Orozco, J. Hall, G.M. Staebler, E. Belli, J. Candy, 64th Meeting of the APS DPP (Nov 2022)

Big data approach to validating TGLF and training TGLF-NN, **T.F. Neiser**, O. Meneghini, S.P. Smith, A. Eubanks, J. Hall, M. Fasciana, G.M. Staebler, E. Belli and J. Candy, ITER International Summer School (July 2022)

Recent results from the big data approach to validating TGLF, **T.F. Neiser**, O. Meneghini, S.P. Smith, A. Eubanks, G. Staebler, J. Candy, U.S.-E.U. Transport Task Force Meeting (April 2022).

An Empirical Neural Network Transport Model Fit to a Large DIII-D Database, A. Eubanks, O. Meneghini, S. P. Smith, **T. F. Neiser**, 62nd Meeting of the APS DPP (2020). Bibcode: [2020APS..DPPZ08011E](#)

Indirect evidence for a hybrid ITG/TEM scenario in nonlinear simulations of a DIII-D near-edge L-mode plasma, **T. F. Neiser**, F. Jenko, T. A. Carter, L. Schmitz, P. C. Crandall, G. Merlo, D. Told, A. Bañón Navarro, Z. Yan and G. R. McKee, 61st Meeting of the APS DPP (2019). Bibcode: [2019APS..DPPP10125N](#)

Cosmological implications of a degenerate antineutrino star, **T. F. Neiser**, 233rd Meeting of the American Astronomical Society (2019). Bibcode: [2019AAS...23334908N](#)

Characterizing near-edge DIII-D L-mode plasmas with gyrokinetic GENE simulations, **T. F. Neiser**, F. Jenko, T. A. Carter, L. Schmitz, P. C. Crandall, G. Merlo, D. Told, A. Bañón Navarro, G. R. McKee and Z. Yan, 60th Meeting of the APS DPP (2018). Bibcode: [2018APS..DPPN11064N](#)

GENE simulations of near-edge L-mode plasmas in DIII-D: Can gyrokinetics recover the experimental heat fluxes?, **T. F. Neiser**, F. Jenko, T. A. Carter, L. Schmitz, G. Merlo, D. Told, A. Bañón Navarro, P. C. Crandall, Z. Yan and G. R. McKee, U.S. Transport Task Force Meeting, San Diego (2018).

LH Transition Dynamics in ITER-Similar D, He, and H Plasmas, L. Schmitz, T.L. Rhodes, **T. Neiser**, L. Zeng, Z. Yan, G. R. McKee, P. Gohil, L. Bardoczi, D. Eldon, C. C. Petty, B. Grierson, 59th Meeting of the APS DPP (2017). Bibcode: [2017APS..DPPG11094S](#)

Towards a Physics-Based LH Transition Model, L. Schmitz, T. L. Rhodes, **T.F. Neiser**, L. Bardoczi, F. Jenko, L. Zeng, P. Gohil, C. Chrystal, B. A. Grierson, D. Eldon, Z. Yan, G. R. McKee, J. Boedo, 58th Meeting of the APS DPP (2016). Bibcode: [2016APS..DPPJ10110S](#)

Computational analysis of two-fluid edge plasma stability in tokamak geometries, **T.F. Neiser**, D. Baver, T. Carter, J. Myra, P. Snyder, M. Umansky, 55th APS DPP (2013). Bibcode: [2013APS..DPPPP8034N](#)

Two-fluid edge plasma stability analysis in divertor tokamak geometry, **T.F. Neiser**, D. Baver, T. Carter, J. Myra, P. Snyder, M. Umansky, 54th APS DPP (2012). Bibcode: [2012APS..DPPBP8150N](#)