

CURRICULUM VITAE

William Douglass Dorland

1. PERSONAL INFORMATION

William Dorland
Department of Physics
Professor (promoted 2009)

Educational background

B. S., Physics, 1988, The University of Texas at Austin
M. A., Astrophysical Sciences, 1990, Princeton University
M. P. A., Public and International Affairs, 1993, Princeton University
Ph. D., Astrophysical Sciences, 1993, Princeton University

Employment background

University of Maryland, (7/09 - present), Professor
University of Oxford, (3/10 - 2/22), Visiting Professor
University of Oxford, Merton College, (3/10 - present), Member of Common Room
University of Vienna, (2009-10), Wolfgang Pauli Fellow
University of Maryland, (1/09 - 12/16), Honors College Director
University of Maryland, (Fall 2008) IREAP Acting Director
University of Maryland, (7/05 - 6/09), Associate Professor
Imperial College, London, (2003 - 2017), Visiting Reader
University of Maryland, (9/01 - 6/05), Assistant Professor
Imperial College, London, (9/01 - 8/02), Reader
University of Maryland, (1/98 - 8/01), Associate Research Scientist
University of Texas, (2/96 - 12/97), Associate Research Scientist
University of Texas, (9/93 - 2/96), Postdoctoral Fellow
U. S. State Department, (6/90 - 8/90), Intern

2. RESEARCH, SCHOLARLY, AND CREATIVE ACTIVITIES

a. Books

iii. Books authored

1. *Nuclear Forensics: Roles, State of the Art, Program Needs*, APS Panel on Public Affairs/AAAS Joint Study (2008).
2. *Plasma Science: Advancing Knowledge in the National Interest*, National Research Council of the National Academies, National Academies Press, 2007. S. C. Cowley, J. Peoples, J. Callen, F. Chang-Diaz, T. Ditmire, W. Dorland, W. Gekelman, S. Girshick, D. Hammer, E. Ippen, M. Kushner, K. Lynch, J. Menard, L. Merminga, E. Quataert, T. Sommere, C. Surko, M. Tabak.
3. *Fusion Energy Sciences Roundtable on Quantum Information Science*, W. Dorland and T. Schenkel, DOE/OFES report series, (2018)

iii. Chapters in Books

1. W. Dorland, G. W. Hammett, T. S. Hahm, and M. A. Beer, “Nonlinear Gyrofluid Model of ITG Turbulence”, in *Ion Temperature Gradient Driven Turbulent Transport*, W. Horton, M. Wakatani, and A. Wootton, Eds., American Institute of Physics, (1993).
2. D. S. Zimmerman, S. A. Triana, D. R. Sisan, W. A. Tillotson, W. Dorland, and D. P. Lathrop, “Characterization of the Magnetorotational Instability from a Turbulent Background State,” in *MHD Couette Flows: Experiments and Models*, eds. R. Rosner, Gunther Rudiger, and A. Bonanno (AIP Press, 2004).

b. Articles in Refereed Journals:

1. G. W. Hammett, W. Dorland and F. W. Perkins, *Fluid Models of Phase Mixing, Landau Damping, and Nonlinear Gyrokinetic Dynamics*, *Physics of Fluids B*, **4**, 2052-2061, (1992).
2. G. W. Hammett, M. A. Beer, W. Dorland, S. C. Cowley, and S. A. Smith, *Developments in the Gyrofluid Approach to Tokamak Turbulence Simulations*, *Plasma Phys. Control. Fusion*, **35**, 973-985, (1993).
3. W. Dorland and G. W. Hammett, *Gyrofluid Turbulence Models with Kinetic Effects*, *Phys. Fluids B*, **5**, 812-835, (1993).
4. S. E. Parker, W. Dorland, R. A. Santoro, M. A. Beer, Q. P. Liu, W. W. Lee, and G. W. Hammett, *Comparisons of Gyrofluid and Gyrokinetic Simulations*, *Phys. Plasmas*, **1**, 1461-1468, (1994).
5. J. Q. Dong, W. Horton, and W. Dorland, *Isotope Scaling and η_i Mode with Impurities in Tokamak Plasmas*, *Phys. Plasmas*, **1**, 3635-3640, (1994).
6. K. McGuire, H. Adler, P. Alling, C. Ancher, H. Anderson, J. L. Anderson, J. W. Anderson, V. Arunasalam, G. Ascione, D. Ashcroft, Cris W. Barnes, G. Barnes, S. Batha, G. Bateman, M. Beer, M. G. Bell, R. Bell, M. Bitter, W. Blanchard, N. L. Bretz, C. Brunkhorst, R. Budny, C. E. Bush, R. Camp, M. Caorlin, H. Carnevale, S. Cauffman, Z. Chang, C. S. Chang, C. Z. Cheng, J. Chrzanowski, J. Collins, G. Coward, M. Cropper, D. S. Darrow, R. Daugert, J. DeLooper, R. Dendy, W. Dorland, L. Dudek, H. Duong, R. Durst, P. C. Efthimion, D. Ernst, H. Evenson, N. Fisch, R. Fisher, R. J. Fonck, E. Fredd, E. Fredrickson, N. Fromm, G. Y. Fu, T. Fujita, H. P. Furth, V. Garzotto, C. Gentile, J. Gilbert, J. Gioia, N. Gorelenkov, B. Grek, L. R. Grisham, G. Hammett, G. R. Hanson, R. J. Hawryluk, W. Heidbrink, H. W. Herrmann, K. W. Hill, J. Hosea, H. Hsuan, M. Hughes, R. Hulse, A. Janos, D. L. Jassby, F. C. Jobes, D. W. Johnson, L. C. Johnson, M. Kalish, J. Kamperschroer, J. Kesner, H. Kugel, G. Labik, N. T. Lam, P. H. LaMarche, E. Lawson, B. LeBlanc, J. Levine, F. M. Levinton, D. Loesser, D. Long, M. J. Loughlin, J. Machuzak, R. Majeski, D. K. Mansfield, E. S. Marmor, R. Marsala, A. Martin, G. Martin, E. Mazzucato, M. Mauel, M. P. McCarthy, J. McChesney, B. McCormack, D. C. McCune, G. McKee, D. M. Meade, S. S. Medley, D. R. Mikkelsen, S. V. Mirnov, D. Mueller, M. Murakami, J. A. Murphy, A. Nagy, G. A. Navratil, R. Nazikian, R. Newman, M. Norris, T. O'Connor, M. Oldaker, J. Ongena, M. Osakabe, D. K. Owens, H. Park, W. Park, P. Parks, S. F. Paul, G. Pearson, E. Perry, R. Persing, M. Petrov, C. K. Phillips,

- M. Phillips, S. Pitcher, R. Pysher, A. L. Qualls, S. Raftopoulos, S. Ramakrishnan, A. Ramsey, D. A. Rasmussen, M. H. Redi, G. Renda, G. Rewoldt, D. Roberts, J. Rogers, R. Rossmassler, A. L. Roquemore, E. Ruskov, S. A. Sabbagh, M. Sasao, G. Schilling, J. Schivell, G. L. Schmidt, R. Scillia, S. D. Scott, I. Semenov, T. Senko, S. Sesnic, R. Sissingh, C. H. Skinner, J. Snipes, J. Stencel, J. Stevens, T. Stevenson, B. C. Stratton, J. D. Strachan, W. Stodiek, J. Swanson, E. Synakowski, H. Takahashi, W. Tang, G. Taylor, J. Terry, M. E. Thompson, W. Tighe, J. R. Timberlake, K. Tobita, H. H. Towner, M. Tuszewski, A. von Halle, C. Vannoy, M. Viola, S. von Goeler, D. Voorhees, R. T. Walters, R. Wester, R. White, R. Wieland, J. B. Wilgen, M. Williams, J. R. Wilson, J. Winston, K. Wright, K. L. Wong, P. Woskov, G. A. Wurden, M. Yamada, S. Yoshikawa, K. M. Young, M. C. Zarnstorff, V. Zverev, and S. J. Zweben, *Review of DT results from TFTR*, Phys. Plasmas, **2**, 2176-2188, (1995).
7. M. Kotschenreuther, W. Dorland, M. A. Beer and G. W. Hammett, *Quantitative Predictions of Tokamak Energy Confinement from First-Principles Simulations with Kinetic Effects*, Phys. Plasmas, **2**, 2381-2389, (1995).
 8. M. G. Bell, K. M. McGuire, V. Arunasalam, C. W. Barnes, S. H. Batha, G. Bateman, M. A. Beer, R. E. Bell, M. Bitter, N. L. Bretz, R. V. Budny, C. E. Bush, S. R. Cauffman, Z. Chang, C.-S. Chang, C. Z. Cheng, D. S. Darrow, R. O. Dendy, W. Dorland, H. H. Duong, R. D. Durst, P. C. Efthimion, D. Ernst, H. Evenson, N. J. Fisch, R. K. Fisher, R. J. Fonck, E. D. Fredrickson, G. Y. Fu, H. P. Furth, N. N. Gorelenkov, B. Grek, L. R. Grisham, G. W. Hammett, G. R. Hanson, R. J. Hawryluk, W. W. Heidbrink, H. W. Herrmann, K. W. Hill, J. C. Hosea, H. Hsuan, M. H. Hughes, R. A. Hulse, A. C. Janos, D. L. Jassby, F. C. Jobs, D. W. Johnson, L. C. Johnson, J. Kesner, H. W. Kugel, N. T. Lam, B. Leblanc, F. M. Levinton, J. Machuzak, R. Majeski, D. K. Mansfield, E. Mazzucato, M. E. Mauel, J. M. McChesney, D. C. McCune, G. McKee, D. M. Meade, S. S. Medley, D. R. Mikkelsen, S. V. Mirnov, D. Mueller, G. A. Navratil, R. Nazikian, D. K. Owens, H. K. Park, W. Park, P. B. Parks, S. F. Paul, M. P. Petrov, C. K. Phillips, M. W. Phillips, C. S. Pitcher, A. T. Ramsey, M. H. Redi, G. Rewoldt, D. R. Roberts, J. H. Rogers, E. Ruskov, S. A. Sabbagh, M. Sasao, G. Schilling, J. F. Schivell, G. L. Schmidt, S. D. Scott, I. Semenov, S. Sesnic, C. H. Skinner, B. C. Stratton, J. D. Strachan, W. Stodiek, E. J. Synakowski, H. Takahashi, W. M. Tang, G. Taylor, J. L. Terry, M. E. Thompson, W. Tighe, S. Von Goeler, R. B. White, R. M. Wieland, J. R. Wilson, K.-L. Wong, P. Woskov, G. A. Wurden, M. Yamada, K. M. Young, M. C. Zarnstorff and S. J. Zweben *et al.*, Nuclear Fusion, **35**, 1429-1436, (1995).
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- D. K. Owens, H. Park and W. Park, P. Parks, S. F. Paul, M. Petrov, C. K. Phillips, M. Phillips, A. L. Qualls, A. Ramsey, M. H. Redi, G. Rewoldt, D. Roberts, J. Rogers, A. L. Roquemore, E. Ruskov, S. A. Sabbagh, M. Sasao, G. Schilling, J. Schivell, G. L. Schmidt, S. D. Scott, I. Semenov, S. Sesnic, C. H. Skinner, D. Spong, B. C. Stratton, J. D. Strachan, W. Stodiek, E. Synakowski, H. Takahashi, W. Tang, G. Taylor, J. Terry, W. Tighe, J. R. Timberlake, A. von. Halle, S. von. Goeler, R. White, J. R. Wilson, K. L. Wong, G. A. Wurden, K. M. Young, M. C. Zarnstorff, and S. J. Zweben, *Recent DT Results on TFTR*, Plasma Phys. Control. Fusion, **37** A69-A85, (1995).
10. G. D. Kerbel *et al.*, *Interactive Scientific Exploration of Gyrofluid Tokamak Turbulence*, Intl. Journal of Supercomputing Appl., **10**, 182 (1996).
 11. R. J. Hawryluk *et al.*, *Review of D-T results from TFTR*, Fusion Tech., **30**, Part A, 648 (1996).
 12. M. G. Bell, S. Batha, M. Beer, R. E. Bell, A. Belov, H. Berk, S. Bernabei, M. Bitter, B. Breizman, N. L. Bretz, R. Budny, C. E. Bush, J. Callen, S. Cauffman, C. S. Chang, Z. Chang, C. Z. Cheng, D. S. Darrow, R. O. Dendy, W. Dorland, H. Duong, P. C. Efthimion, D. Ernst, H. Evenson, N. J. Fisch, R. Fisher, R. J. Fonck, E. D. Fredrickson, G. Y. Fu, H. P. Furth, N. N. Gorelenkov, V. Ya. Goloborod'ko, B. Grek, L. R. Grisham, G. W. Hammett, R. J. Hawryluk, W. Heidbrink, H. W. Herrmann, M. C. Herrmann, K. W. Hill, J. Hogan, B. Hooper, J. C. Hosea, W. A. Houlberg, M. Hughes, D. L. Jassby, F. C. Jobses, D. W. Johnson, R. Kaita, S. Kaye, J. Kesner, J. S. Kim, M. Kissick, A. V. Krasilnikov, H. Kugel, A. Kumar, N. T. Lam, P. Lamarche, B. LeBlanc, F. M. Levinton, C. Ludescher, J. Machuzak, R. P. Majeski, J. Manickam, D. K. Mansfield, M. Mauel, E. Mazzucato, J. McChesney, D. C. McCune, G. McKee, K. M. McGuire, D. M. Meade, S. S. Medley, D. R. Mikkelsen, S. V. Mirnov, D. Mueller, Y. Nagayama, G. A. Navratil, R. Nazikian, M. Okabayashi, M. Osakabe, D. K. Owens, H. K. Park, W. Park, S. F. Paul, M. P. Petrov, C. K. Phillips, M. Phillips, P. Phillips, A. T. Ramsey, B. Rice, M. H. Redi, G. Rewoldt, S. Reznik, A. L. Roquemore, J. Rogers, E. Ruskov, S. A. Sabbagh, M. Sasao, G. Schilling, G. L. Schmidt, S. D. Scott, I. Semenov, T. Senko, C. H. Skinner, T. Stevenson, E. J. Strait, B. C. Stratton, J. D. Strachan, W. Stodiek, E. Synakowski, H. Takahashi, W. Tang, G. Taylor, M. E. Thompson, S. von Goeler, A. Von Halle, R. T. Walters, S. Wang, R. White, R. M. Wieland, M. Williams, J. R. Wilson, K. L. Wong, G. A. Wurden, M. Yamada, V. Yavorski, K. M. Young, L. Zakharov, M. C. Zarnstorff, and S. J. Zweben, *Deuterium-tritium plasmas in novel regimes in the Tokamak Fusion Test Reactor*, Phys. Plasmas, **4**, 1714-1724, (1997).
 13. J. D. Strachan, S. Batha, M. Beer, M. G. Bell, R. E. Bell, A. Belov, H. Berk, S. Bernabei, M. Bitter, B. Breizman, N. L. Bretz, R. Budny, C. E. Bush, J. Callen, S. Cauffman, C. S. Chang, Z. Chang, C. Z. Cheng, D. S. Darrow, R. O. Dendy, W. Dorland, H. Duong, P. C. Efthimion, D. Ernst, H. Evenson, N. J. Fisch, R. Fisher, R. J. Fonck, E. D. Fredrickson, G. Y. Fu, H. P. Furth, N. N. Gorelenkov, V. Ya. Goloborod'ko, B. Grek, L. R. Grisham, G. W. Hammett, R. J. Hawryluk, W. Heidbrink, H. W. Herrmann, M. C. Herrmann, K. W. Hill, J. Hogan, B. Hooper, J. C. Hosea, W. A. Houlberg, M. Hughes, D. L. Jassby, F. C. Jobses, D. W. Johnson, R. Kaita, S. Kaye, J. Kesner, J. S. Kim, M. Kissick, A. V. Krasilnikov, H. Kugel, A. Kumar, N. T. Lam,

- P. Lamarche, B. Leblanc, F. M. Levinton, C. Ludescher, J. Machuzak, R. P. Majeski, J. Manickam, D. K. Mansfield, M. Mauel, E. Mazzucato, J. McChesney, D. C. McCune, G. McKee, K. M. McGuire, D. M. Meade, S. S. Medley, D. R. Mikkelsen, S. V. Mirnov, D. Mueller, Y. Nagayama, G. A. Navratil, R. Nazikian, M. Okabayashi, M. Osakabe, D. K. Owens, H. K. Park, W. Park, S. F. Paul, M. P. Petrov, C. K. Phillips, M. Phillips, P. Phillips, A. T. Ramsey, B. Rice, M. H. Redi, G. Rewoldt, S. Reznik, A. L. Roquemore, J. Rogers, E. Ruskov, S. A. Sabbagh, M. Sasao, G. Schilling, G. L. Schmidt, S. D. Scott, I. Semenov, T. Senko, C. H. Skinner, T. Stevenson, E. J. Strait, B. C. Stratton, W. Stodiek, E. Synakowski, H. Takahashi, W. Tang, G. Taylor, M. E. Thompson, S. von Goeler, A. von Halle, R. T. Walters, S. Wang, R. White, R. M. Wieland, M. Williams, J. R. Wilson, K. L. Wong, G. A. Wurden, M. Yamada, V. Yavorski, K. M. Young, L. Zakharov, M. C. Zarnstorff, and S. J. Zweben, *TFTR DT experiments*, Plasma Physics and Controlled Fusion, **39**, B103-B114, (1997).
14. D. R. Mikkelsen, S. D. Scott, and W. Dorland, *Testing the ρ_* scaling of thermal transport models: Predicted and measured temperatures in the Tokamak Fusion Test Reactor dimensionless scaling experiments*, Phys. Plasmas, **4**, 1362-1370, (1997).
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 16. P. B. Snyder, G. W. Hammett and W. Dorland, *Landau Fluid Models of Collisionless Magnetohydrodynamics*, Phys. Plasmas, **4**, 3974-3985, (1997).
 17. R. E. Waltz, G. M. Staebler, W. Dorland, M. Kotschenreuther and J. A. Konings, *A Gyro-Landau-fluid Transport Model*, Phys. Plasmas, **4**, 2482-2496, (1997).
 18. R. Hawryluk, S. Batha, W. Blanchard, M. Beer, M. G. Bell, R. E. Bell, H. Berk, S. Bernabei, M. Bitter, B. Breizman, N. L. Bretz, R. Budny, C. E. Bush, J. Callen, R. Camp, S. Cauffman, Z. Chang, C. Z. Cheng, D. S. Darrow, R. O. Dendy, W. Dorland, H. Duong, P. C. Efthimion, D. Ernst, N. J. Fisch, R. Fisher, R. J. Fonck, E. D. Frederickson, G. Y. Fu, H. P. Furth, N. N. Gorelenkov, B. Grek, L. R. Grisham, G. W. Hammett, G. R. Hanson, H. W. Herrmann, M. C. Herrmann, K. W. Hill, J. Hogan, J. C. Hosea, W. A. Houlberg, M. Hughes, R. A. Hulse, D. L. Jassby, F. C. Jobs, D. W. Johnson, R. Kaita, S. Kaye, J. S. Kim, M. Kissick, A. V. Krasilnikov, H. Kugel, A. Kumar, B. Leblanc, F. M. Levinton, C. Ludescher, D. K. Mansfield, J. McChesney, D. C. McCune, K. M. McGuire, R. P. Majeski, J. Manickam, E. Mazzucato, D. M. Meade, S. S. Medley, R. Mika, D. R. Mikkelsen, S. V. Mirnov, D. Mueller, A. Nagy, G. A. Navratil, R. Nazikian, M. Okabayashi, H. K. Park, W. Park, S. F. Paul, G. Pearson, M. P. Petrov, C. K. Phillips, M. Phillips, A. T. Ramsey, M. H. Redi, G. Rewoldt, S. Reznik, A. L. Roquemore, J. Rogers, E. Ruskov, S. A. Sabbagh, M. Sasao, G. Schilling, J. Schivell, G. L. Schmidt, S. D. Scott, I. Semenov, C. H. Skinner, T. Stevenson, J. D. Strachan, B. C. Stratton, W. Stodiek, E. Synakowski, W. Tang, G. Taylor, M. E. Thompson, S. Von Goeler, A. Von Halle, R. T. Walters, R. White, R. M. Wieland, M. Williams, J. R. Wilson, K. L. Wong, G. A. Wurden, M. Yamada, V. Yavorski, K. M. Young, L. Zakharov, M. C. Zarnstorff, and S. J. Zweben *Fusion Plasma Experiments on TFTR: A 20 Year Retrospective*, Phys. Plasmas, **5**, 1577-1589, (1997).

19. M. Greenwald, J. Schachter, W. Dorland, R. Granetz, A. Hubbard, J. Rice, J. A. Snipes, P. Stek, and S. Wolfe, *Transport phenomena in Alcator C-Mod H-modes*, Plasma Physics and Controlled Fusion, **40**, 789-792, (1998).
20. R. Hawryluk, S. Batha, W. Blanchard, M. Beer, M. G. Bell, R. E. Bell, H. Berk, S. Bernabei, M. Bitter, B. Breizman, N. L. Bretz, R. Budny, C. E. Bush, J. Callen, R. Camp, S. Cauffman, Z. Chang, C. Z. Cheng, D. S. Darrow, R. O. Dendy, W. Dorland, H. Duong, P. C. Efthimion, D. Ernst, N. J. Fisch, R. Fisher, R. J. Fonck, E. D. Frederickson, G. Y. Fu, H. P. Furth, N. N. Gorelenkov, B. Grek, L. R. Grisham, G. W. Hammett, G. R. Hanson, H. W. Herrmann, M. C. Herrmann, K. W. Hill, J. Hogan, J. C. Hosea, W. A. Houlberg, M. Hughes, R. A. Hulse, D. L. Jassby, F. C. Jobs, D. W. Johnson, R. Kaita, S. Kaye, J. S. Kim, M. Kissick, A. V. Krasilnikov, H. Kugel, A. Kumar, B. Leblanc, F. M. Levinton, C. Ludescher, D. K. Mansfield, J. McChesney, D. C. McCune, K. M. McGuire, R. P. Majeski, J. Manickam, E. Mazzucato, D. M. Meade, S. S. Medley, R. Mika, D. R. Mikkelsen, S. V. Mirnov, D. Mueller, A. Nagy, G. A. Navratil, R. Nazikian, M. Okabayashi, H. K. Park, W. Park, S. F. Paul, G. Pearson, M. P. Petrov, C. K. Phillips, M. Phillips, A. T. Ramsey, M. H. Redi, G. Rewoldt, S. Reznik, A. L. Roquemore, J. Rogers, E. Ruskov, S. A. Sabbagh, M. Sasao, G. Schilling, J. Schivell, G. L. Schmidt, S. D. Scott, I. Semenov, C. H. Skinner, T. Stevenson, J. D. Strachan, B. C. Stratton, W. Stodiek, E. Synakowski, W. Tang, G. Taylor, M. E. Thompson, S. Von Goeler, A. Von Halle, R. T. Walters, R. White, R. M. Wieland, M. Williams, J. R. Wilson, K. L. Wong, G. A. Wurden, M. Yamada, V. Yavorski, K. M. Young, L. Zakharov, M. C. Zarnstorff, and S. J. Zweben, *Results from D-T Experiments and TFTR and Implications for Achieving an Ignited Plasma*, Phil. Trans. R. Soc. London A, **357**, 443 (1999).
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22. F. Jenko, W. Dorland, M. Kotschenreuther, and B. N. Rogers, *Electron Temperature Gradient Driven Turbulence*, Phys. Plasmas, **7**, 1904-1910, (2000).
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115. K. D. Nielson and G. G. Howes and W. Dorland, *Alfvén wave collisions, the fundamental building block of plasma turbulence. II. Numerical solution*, Physics of Plasmas, **20**, 072303 (2013).
116. R. Numata and G. G. Howes and T. Tatsuno and M. Barnes and W. Dorland, *Corrigendum to AstroGK: Astrophysical gyrokinetics code, (JCP 229 (2010) 9347-9372)*, Journal of Computational Physics, **245**, 493 (2013).
117. J. M. TenBarge and G. G. Howes and W. Dorland, *Collisionless damping at electron scales in solar wind turbulence*, The Astrophysical Journal, **774**, 139 (2013).
118. S. A. Sabbagh and J. W. Ahn and J. Allain and others, including W. Dorland, *Overview of physics results from the conclusive operation of the National Spherical Torus Experiment*, Nuclear Fusion, **53**, 104007 (2013).
119. J. M. TenBarge and G. G. Howes and W. Dorland and G. W. Hammett, *An oscillating Langevin antenna for driving plasma turbulence simulations*, Computer Physics Communications, **185**, 578 (2014).
120. J. M. TenBarge and W. Daughton and H. Karimabadi and G. G. Howes and W. Dorland, *Collisionless reconnection in the large guide field regime: Gyrokinetic versus particle-in-cell simulations*, Physics of Plasmas, **21**, 020708 (2014).
121. J. Ball and F. I. Parra and M. Barnes and W. Dorland and G. W. Hammett and P. Rodrigues and N. F. Loureiro, *Intrinsic momentum transport in up-down asymmetric tokamaks*, Plasma Physics and Controlled Fusion, **56**, 095014 (2014).
122. G. J. Wilkie and I. G. Abel and E. G. Highcock and W. Dorland, *Validating modeling assumptions of alpha particles in electrostatic turbulence*, Journal of Plasma Physics, **81**, 905810306 (2014)
123. A. Kanekar and A. A. Schekochihin and W. Dorland and N. F. Loureiro, *Fluctuation-dissipation relations for a plasma-kinetic Langevin equation*, Journal of Plasma Physics, **81**, 305810104 (2015).
124. M. Landreman, G. G. Plunk and W. Dorland, *Generalized universal instability: transient linear amplification and subcritical turbulence*, Journal of Plasma Physics, **81**, 905810501 (2015)

125. M. Landreman, T. M. Antonsen, Jr. and W. Dorland, *Universal instability for wavelengths below the ion Larmor scale*, Physical Review Letters, **114**, 095003 (2015)
126. I. T. Chapman, J. Adamek, *et al.*, *Overview of MAST results*, Nuclear Fusion, **55**, 104008 (2015)
127. G. Merlo, O. Sauter, S. Brunner, A. Burckel, Y. Camenen, F. J. Casson, W. Dorland, E. Fable, T. Goerler, F. Jenko, A. G. Peeters, D. Told, L. Villard, *Linear multispecies gyrokinetic flux tube benchmarks in shaped tokamak plasmas*, Physics of Plasmas, **23**, 032104 (2016)
128. F. van Wyk, E. G. Highcock, A. A. Schekochihin, C. M. Roach, A. R. Field, W. Dorland, *Transition to subcritical turbulence in a tokamak plasma*, Journal of Plasma Physics, **82**, 905820609, (2016)
129. A. A. Schekochihin, J. Parker, E. Highcock, P. Dellar, W. Dorland, G. W. Hammett, *Phase mixing versus nonlinear advection in drift-kinetic plasma turbulence*, Journal of Plasma Physics **82**, 905820212 (2016)
130. G. J. Wilkie, I. G. Abel, M. Landreman, W. Dorland, *Transport and deceleration of fusion products in microturbulence*, Physics of Plasmas, **23**, 060703 (2016)
131. G. J. Wilkie, W. Dorland, *Fundamental form of the electrostatic delta-f PIC algorithm and discovery of a converged numerical instability*, Physics of Plasmas, **23**, 052111 (2016)
132. N. F. Loureiro, W. Dorland, L. Frazendeiro, A. Kanekar, A. Mallet, M. S. Vilelas, A. Zocco, *Viriato: A Fourier-Hermite spectral code for strongly magnetized fluid-kinetic plasma dynamics*, Computer Physics Communications, **206**, 45 (2016)
133. A. Kirk, J. Adamek, *et al.*, *Overview of recent physics results from MAST*, Nuclear Fusion, **57**, 102007 (2017)
134. E. J. Paul, M. Landreman, F. M. Poli, D. Spong, H. Smith, W. Dorland, *Rotation and neoclassical ripple transport in ITER*, Nuclear Fusion, **57**, 116044 (2017)
135. G. J. Wilkie, I. Pusztai, I. G. Abel, W. Dorland, T. Fulop, *Global anomalous transport of ICRH-and NBI-heated fast ions*, Plasma Physics and Controlled Fusion, **59**, 044007 (2017)
136. F. van Wyk, E. G. Highcock, A. R. Field, C. M. Roach, A. A. Schekochihin, F. I. Parra, W. Dorland, *Ion-scale turbulence in MAST: anomalous transport, subcritical transitions, and comparison to BES measurements*, Plasma Physics and Controlled Fusion, **59**, 114003, (2017)
137. G. J. Colyer, A. A. Schekochihin, F. Parra, C. M. Roach, M. A. Barnes, Y.-c. Ghim, W. Dorland, *Collisionality scaling of the electron heat flux in ETG turbulence*, Plasma Physics and Controlled Fusion, **59**, 055002 (2017)
138. E. Highcock, N. Mandell, M. Barnes, W. Dorland, *Optimisation of confinement in a fusion reactor using a nonlinear turbulence model*, Journal of Plasma Physics, **84**, 905840208. (2018)

139. N. Mandell, W. Dorland, M. Landreman, *Laguerre-Hermite pseudo-spectral velocity formulation of gyrokinetics*, Journal of Plasma Physics, **84**, 905840108, (2018)
140. M. Barnes, P. Abiuso, W. Dorland, *Turbulent heating in an inhomogeneous magnetized plasma slab*, Journal of Plasma Physics, **84**, 905840306 (2018)
141. J. Juno, A. Hakim, J. TenBarge, E. Shi, W. Dorland, *Discontinuous Galerkin algorithms for fully kinetic plasmas*, Journal of Computational Physics, **353**, 110 (2018)
142. J. Bringewatt, W. Dorland, S. P. Jordan, A. Mink, *Diffusion Monte Carlo approach versus adiabatic computation for local Hamiltonians*, Physical Review A, **97**, 022323 (2018)
143. M. F. Martin, M. Landreman, P. Xanthopoulos, N. R. Mandell, W. Dorland, *The parallel boundary condition for turbulence simulations in low magnetic shear devices*, **60**, 095008 (2018)
144. E. J. Paul, M. Landreman, A. Bader, W. Dorland, *An adjoint method for gradient-based optimization of stellarator coil shapes*, Nuclear Fusion, **58**, 076015 (2018)
145. R. Meyrand, A. Kanekar, W. Dorland, A. Shekochihin, *Fluidization of Collisionless Plasma Turbulence*, Proceedings of the National Academy of Sciences, **116**, 1184 (2019)

c. Monographs, Reports, and Extension Publications

- R. E. Waltz, B. I. Cohen, M. A. Beer, A. M. Dimits, W. Dorland, S. E. Parker, R. A. Santoro, R. D. Sydora, and H. V. Wong, *Numerical Tokamak Project Code Comparison*, UCRL-ID-117670, June, 1994.
- G. W. Hammett, W. Dorland, M. A. Beer, M. Kotschenreuther, *Potential Methods For Improving Pedestal Temperatures and Fusion Performance*, Princeton Plasma Physics Laboratory Report #3360; available at http://www.pppl.gov/pub_report/.
- M. Kotschenreuther and W. Dorland, *Memorandum on Confinement Projections To: FE-SAC ITER Confinement reviewers*, (Feb. 14, 1997), EPAPS Document No. E-PHPAEN-7-037003.
- M. Kotschenreuther and W. Dorland, *The Physics Basis of Energy Confinement Projections for ITER*, Report to ITER Expert Group, October, 1995, (*copies available on request*).

e. Talks, Abstracts, and Other Professional Papers Presented

i. Invited talks by William Dorland

- Multi-Site Collaboration in the Numerical Tokamak Project: Gyrofluid Simulations*, DoE Workshop: Distributed Collaborative Research Environments, CEBAF, December, 1993.
- Transport Modelling at the Institute for Fusion Studies*, Transport in Fusion Plasmas Workshop, Gothenberg, Sweden, June, 1994.
- Comparisons of Nonlinear Toroidal Turbulence Simulations with Experiment*, International Atomic Energy Agency Conference on Plasma Physics and Controlled Nuclear Fusion Research, Seville, Spain, October, 1994.

Thermal Conductivity in Turbulent Plasma: Implications for ITER ITER Expert Group on Confinement and Modelling, ITER Joint Working Site, March, 1995.

Comparisons of Gyrofluid and Gyrokinetic Simulations and Predictions, Numerical Tokamak Symposium, Incline Village, Nevada, April, 1995.

Turbulence and Transport Simulations, Sherwood Fusion Theory Conference, Incline Village, Nevada, April, 1995.

Thermal Conductivity in Turbulent Plasma: Simulation vs. Experiment, American Physical Society Spring meeting, Washington, DC, April, 1995.

Turbulent Thermal Conductivity in Tokamaks, University of Colorado, Boulder, CO, April, 1995.

ITG Simulations of Tokamak Experiments, JT-60U Seminar, Japan, June, 1995.

ITG Simulations of JET Experiments, Joint European Torus, England, July, 1995.

Implications of ITG Theory for ITER, ITER Working Group on Confinement and Transport, Princeton, September, 1995.

Predictions of Reactor Performance Using Anomalous Transport Models, Sherwood Fusion Theory Conference, Philadelphia, March, 1996.

The Case for Advanced Confinement, General Atomics, May, 1996.

3D Simulations of Tokamak Plasma Turbulence: Experimental Tests and Predictions, Workshop on the Theory of Fusion Plasmas, Varenna, Italy, August, 1996.

Using Realistic Turbulence Simulations to Understand Anomalous Transport in Tokamaks, Second Workshop on Nonlinear Dynamics, Transport, Turbulence, And Magnetic Fusion, New York University, October, 1996.

Thermal Conductivity of Turbulent, Magnetized Plasma, University of Texas Physics Colloquium, November, 1996.

Thermal Conductivity of Turbulent, Magnetized Plasma, University of Nevada at Las Vegas Physics Colloquium, April, 1997.

Cyclone Project Progress Report, ITER Working Group on Confinement Database and Modeling, Garching, Germany, September, 1997.

Three Invited Lectures on *Gyrofluid Simulations of Tokamak Microturbulence*, Abdus Salam International Centre for Theoretical Physics, Trieste, 1997.

Neoclassical Spherical Tokamaks, American Physical Society, Division of Plasma Physics, Pittsburgh, 1997.

Review of Tokamak Energy Confinement Scalings, VIII Latin American Workshop on Plasma Physics, 1998.

Future Directions of Plasma Physics, International Congress on Plasma Physics, Prague, 1998.

Predicting Tokamak Performance with Confidence, Third Symposium on Current Trends in International Fusion Research, Washington, DC, 1999.

Computational Plasma Physics in the US Fusion Program, Fusion Science Assessment Committee meeting, National Academy of Science, 1999.

Turbulence and Microstability Considerations for AT Operation, Workshop on Physics Requirements for Advanced Tokamaks, 1999.

Three Invited Lectures on *Gyrokinetics, Secondary Instabilities, and Sheared Flows*, Abdus Salam International Centre for Theoretical Physics, Trieste, 1999.

Electron Temperature Gradient Driven Turbulence, Massachusetts Institute of Technology, Colloquium, 2000.

Electromagnetic Gyrokinetic Turbulence Simulations, Sherwood International Theory Conference, 2000.

Sheared Flows in Gyrokinetic Turbulence Simulations, US-Japan Workshop on Physics of Shear Flows in Plasmas, Tokyo, 2000.

Gyrokinetic Simulations of Tokamak Microturbulence, IAEA Fusion Energy Conference, Sorrento, 2000.

Numerical Simulations and Burning Plasma Concepts in 2004, Fourth Symposium on Current Trends in International Fusion Research, Washington, DC, 2001.

Gyrokinetics at Imperial College, Joint European Torus Colloquium, Nov 26, 2001.

Gyrokinetic Turbulence Simulations, Culham Laboratory Colloquium, Nov 7, 2001.

Theoretical insights into short wavelength plasma turbulence, Culham Laboratory, Feb, 2002.

Collisionless plasma turbulence, with astrophysical applications, Institute for Fusion Studies, Feb 2002.

Collisionless plasma turbulence, 29th Annual IoP Plasma Physics Group Conference, March 2002.

Secondary instabilities in ETG Turbulence, VII Easter Plasma Meeting, April 2002.

Gyrokinetic Turbulence in Magnetically Confined Plasmas, European Physical Society, Montreux 2002.

Turbulent Heating in the Kinetic Alfvén Wave Cascade, Center for Scientific Computation and Mathematical Modeling, UM, Nov 26, 2002.

Theoretical insights into short wavelength plasma turbulence, Columbia University, Nov 2002.

US Plasma Microturbulence Project, Eighth International Symposium on Simulation Science, Hayama, Japan, 2003.

Sheared flows and boundary layer physics in tokamak plasma, “New Themes in Plasma and Fusion Turbulence”, Royal Society, London, May, 2003.

Sheared flows and H-mode pedestal structure, MIT seminar, May 2003.

Anomalous heating in a kinetic Alfvén wave cascade, 7th Workshop on the Interrelationship between Plasma Experiment in Laboratory and Space, July 2003.

Resonant Heating in an Alfvén Cascade, Workshop on Kinetic Theory, Fields Institute (Toronto), April 2004.

Resonant Heating in the Alfvén Cascade + Introduction to Gyrokinetics, Workshop on Theoretical Plasma Physics, International Centre for Theoretical Physics (Trieste), July 2004.

Recent Advances in the Theory of Magnetized Plasma Turbulence, UCLA Physics Department Colloquium, January 2005.

Multiscale Extensions of Gyrokinetics, Multiscale Processes in Fusion Plasmas Conference, Institute for Pure and Applied Mathematics, (UCLA) January 2005.

Instabilities of Transport Barriers, University of Wisconsin Physics Department Colloquium, February 2005.

Review of MRI Research in the Laboratory, Physics of Astrophysical Outflows and Accretion Disks, Kavli Institute for Theoretical Physics, UCSB, May 2005.

Three Transport Barrier Instabilities, MIT plasma physics seminar, May 2005.

Plasma Turbulence in Astrophysics and in the Laboratory, University of Maryland physics colloquium (2005).

Teaching Electricity and Magnetism to Graduate Students: Key Concepts from Plasma Physics, Gordon Research Conference on Physics and Education (2006).

Gyrokinetic Plasma Turbulence in Astrophysics and in the Laboratory, University of Delaware physics colloquium (2006).

Modeling of Turbulent Transport, Stanford Global Climate and Energy Project Workshop, Princeton University (2006).

Plasma Turbulence in Astrophysics and in the Laboratory, Dartmouth College colloquium (2006).

Landau Damping and Irreversibility in Gyrokinetic Simulations, International Workshop on Frontiers of Plasma Physics, ICTP, Trieste, Italy (2006).

Laboratory Studies of Turbulence Induced by the Magnetorotational Instability, International Workshop on Frontiers of Plasma Physics, ICTP, Trieste, Italy (2006).

Plasma Turbulence in Astrophysics and in the Laboratory, Plenary Talk, APS April meeting (2006).

Irreversibility in Weakly Collisional Plasma Turbulence, Workshop Plasma Magnetises, University of Nice, France (2006).

Plasma Turbulence in Tokamaks, CMPD Winter School (2007).

Physics Processes Governing the Spectrum of Self-Excited Flows in Turbulent Plasma, CMPD Winter School (2007).

Astrophysical Gyrokinetic Turbulence and Heating, Center for Magnetic Self-Organization (UNH), (2007).

Multi-scale Transport Physics Research, National Tokamak Planning Workshop (MIT), (2007).

Plasma turbulence in astrophysics and in the laboratory: Landau damping and irreversibility in gyrokinetic simulations, SIAM Conf on Computational Science and Engineering, (2007).

Anomalous Heating in Weak and Strong Turbulence, Wolfgang Pauli Institute, Vienna (2007).

Energy Production and Global Warming, Academic Kick-off Talk for 2007/08 University of Maryland Honors Program (2007).

Turbulent Heating of Hot, Magnetized Plasma, International Conference on New Energy Sources, Tbilisi, Georgia (2007).

GPU Applications at the University of Maryland, Astro-GPU Workshop, Institute for Advanced Studies, Princeton, NJ (2007). Also served as panel member for summary session.

Gyrokinetics and Multiscale Plasma Physics, Wolfgang Pauli Institute, Vienna (2008).

Instabilities of flowing fluids/plasmas: Kelvin-Helmholtz and MRI, UCLA (2008).

Kinetic Turbulence in Space and Astrophysical Plasmas, Maryland Space Sciences Seminar (2008).

Progress in gyrokinetics: Kinetic turbulence in space and astrophysical plasmas, Culham Laboratory (2008).

GPU Applications at the University of Maryland, Culham Laboratory (2008).

How we crammed a black hole, a star cluster and a turbulent plasma into a GPU (and lived to tell about it), NVision (2008).

5-D Plasma Turbulence, University of Delaware (2008).

5-D Plasma Turbulence, MIT PSFC Seminar (2008).

5-D Plasma Turbulence, Princeton Picasso Seminar (2008).

5-D Plasma Turbulence, UT-Austin Physics Colloquium (2008).

5-D Plasma Turbulence, Univ. Maryland Physics Colloquium (2008).

Modeling essentially kinetic features of astrophysical turbulence, AstroNum (2008).

5-D Plasma Turbulence, Michigan State University Colloquium (2009).

Computational Astrophysics, NVidia CUDA Center of Excellence Workshop (2009).

Transport and Turbulence, DOE Exascale Workshop (2009).

Clustered many-core computing with CPUs + GPUs, [3 talks] Institute for Advanced Study Prospects in Theoretical Physics (2009).

Magnetized plasma turbulence in the laboratory and in nature, Princeton PPL Colloquium (2009).

Modeling essentially kinetic features of astrophysical turbulence: Turbulence in 5 dimensions, West Virginia University Physics Colloquium [Bernard R. Cooper Lecture] (2009).

What next?, University of Vienna (2009).

The Trinity algorithm: Local gyrokinetics + global transport = predictive model of tokamak plasma dynamics, Institute for Pure and Applied Mathematics Workshop, UCLA (2009).

Shear-flow driven instabilities in transport barriers, Oxford University Colloquium (2009).

What next?, University of Vienna (2010).

Magnetized Plasma Turbulence in Nature and in the Laboratory, Plenary talk, European Physical Society, 2010.

Gyrokinetics in astrophysics – from tokamaks to galaxies, April Meeting of the APS, 2010.

Plasma turbulence in the solar wind, University of Wisconsin Physics Department Colloquium, 2010.

The turbulent cascade of entropy in kinetic simulations of plasma turbulence, SIAM Annual Meeting, 2010.

Gyrokinetics outside tokamaks, Isaac Newton Centre for Mathematical Sciences, Cambridge University, July 2010.

Turbulence in astrophysical and laboratory plasmas, Columbia University, September 2010.

Turbulence in astrophysical and laboratory plasmas, University of Michigan, October 2010.

Talks since October, 2010, not documented

iii. Unrefereed conference proceedings

- N. Bretz *et al.*, in Proceedings of Intl. Conf. on Plasma Physics, Brazil, (1994).
- R. J. Hawryluk *et al.*, *Review of Recent D-T Experiments from TFTR*, in proceedings of the 1994 IAEA conference on Plasma Physics and Controlled Nuclear Fusion Research, Vol. I, 11, (1994).
- M. G. Bell, *et al.*, *Fusion Power Production in TFTR*, in proceedings of the 1994 IAEA conference on Plasma Physics and Controlled Nuclear Fusion Research, **1**, 171, (1995).
- G. W. Hammett, M. A. Beer, J. C. Cummings, W. Dorland, W. W. Lee, H. E. Mynick, S. E. Parker, R. A. Santoro, M. Artun, H. P. Furth, T. S. Hahm, G. Rewoldt, W. M. Tang, R. E. Waltz, G. D. Kerbel, J. Milovich, *Advances in Simulating Tokamak Turbulent Transport*, in proceedings of the 1994 IAEA conference on Plasma Physics and Controlled Nuclear Fusion Research.
- W. Dorland, M. Kotschenreuther, M. A. Beer, G. W. Hammett, R. E. Waltz, R. R. Dominguez, P. M. Valanju, W. H. Miner, Jr., J. Q. Dong, W. Horton, F. L. Waelbroeck, T. Tajima, and M. J. LeBrun, *Comparisons of Nonlinear Toroidal Turbulence Simulations with Experiment*, in proceedings of the 1994 International Atomic Energy Agency (IAEA) conference on Plasma Physics and Controlled Nuclear Fusion Research.
- W. Dorland, M. Kotschenreuther, Q. P. Liu, M. A. Beer, and G. W. Hammett, *3D Simulations of Tokamak Plasma Turbulence: Experimental Tests and Predictions*, in “Theory of Fusion Plasmas” proceedings, Varenna (1996), edited by J. W. Connor, E. Sindoni, and J. Vaclavik.
- K. M. McGuire *et al.*, *Physics of High Performance Deuterium-Tritium Plasmas in TFTR*, in proceedings of the 1996 International Atomic Energy Agency (IAEA) conference on Plasma Physics and Controlled Nuclear Fusion Research.
- T. Takizuka, D. Boucher, T. N. Carlstrom, J. G. Cordey, J. W. Connor, A. N. Chudnovskij, J. C. DeBoo, W. Dorland, Yu. V. Esipchuk, S. J. Fielding, T. Fukuda, R. S. Granetz, M. Greenwald, G. T. Hoang, W. Houlberg, Y. Kamada, O. J. W. F. Kardaun, S. M. Kaye, M. Kikuchi, A. Kus, Y. Martin, T. Matsuda, Y. Miura, O. Naito, Y. Ogawa, J. Ongena, W. Ossipenko, F. W. Perkins, E. Righi, F. Ryter, D. P. Schissel, J. A. Snipes, U. Stroth, H. Tamai, K. Thomsen, M. Valovic, *Threshold Power and Energy Confinement for ITER*, in proceedings of the 1996 International Atomic Energy Agency (IAEA) conference on Plasma Physics and Controlled Nuclear Fusion Research.
- S. D. Scott *et al.*, *Isotope Scaling of Heating and Confinement in Multiple Regimes of TFTR*, in proceedings of the 1996 International Atomic Energy Agency (IAEA) conference on Plasma Physics and Controlled Nuclear Fusion Research.

- M. Kotschenreuther, W. Dorland, Q. P. Liu, G. W. Hammett, M. A. Beer, S. A. Smith, A. Bondeson, and S. C. Cowley, *First Principles Calculations of Tokamak Energy Transport*, in proceedings of the 1996 International Atomic Energy Agency (IAEA) conference on Plasma Physics and Controlled Nuclear Fusion Research.
- W. Dorland, *et al.*, *Gyrokinetic Simulations of Tokamak Microturbulence*, in Proceedings of the 2000 International Atomic Energy Agency (IAEA) Fusion Energy Conference, Sorrento.
- K. W. Hill, W. Dorland, D. R. Ernst, D. Mikkelsen, G. Rewoldt, S. Higashijima, N. Asakura, H. Shirai, T. Takizuka, S. Konoshima, Y. Kamada, H. Kubo, Y. Miura, *Study of Integrated High-Performance Regimes with Impurity Injection in JT-60U Discharges*, IAEA Fusion Energy Conference, 2002.
- D. R. Mikkelsen, W. Dorland, D. W. Ross, M. Greenwald, S. Wolfe, P. Bonoli, C. Fiore, A. Hubbard, J. Irby, E. Marmor, D. Mossessian, J. Rice, G. Taylor, J. Terry, *Non-linear Simulations of Drift-Wave Turbulence in Alcator C-Mod*, IAEA Fusion Energy Conference, 2002.
- F. Jenko, B. Scott, W. Dorland, A. Kendl, D. Srinzi, *Simulations of Finite Beta Turbulence in Tokamaks and Stellarators*, IAEA Fusion Energy Conference, 2002.
- D. Stutman, *et al.*, *Studies of Improved Electron Confinement on NSTX*, IAEA Fusion Energy Conference, 2004.
- P. N. Guzdar, S. M. Mahajan, Z. Yoshida, W. Dorland, *et al.*, *Theory and Theory-Based Models for the Pedestal, Edge Stability and ELMs in Tokamaks*, IAEA Fusion Energy Conference, 2004.
- D. R. Ernst, N. Basse, P. T. Bonoli, P. J. Catto, W. Dorland, *et al.*, *Mechanisms for ITB Formation and Control in Alcator C-Mod Identified through Gyrokinetic Simulations of TEM Turbulence*, IAEA Fusion Energy Conference, 2004.
- D. R. Ernst, *et al.*, IAEA Fusion Energy Conference, 2006.
- J. Connor, *et al.*, IAEA Fusion Energy Conference, 2006.
- Unrefereed papers published since 2006 not documented*

i. Contracts and Grants

- Principal Investigator, Computational Center for Studies of Plasma Microturbulence, DoE, 2000-2005, \$495,000.
- Principal Investigator, Maryland Controlled Fusion Research Program, DoE, 2005-2007, \$2,029,212.
- Principal Investigator, "Center for Multiscale Plasma Dynamics", 2004-2009, \$2,875,000.
- Co-Investigator, "Algorithms, Scientific Computing and Numerical Studies in Classical and Quantum General Relativity", NSF, 2009-2010, \$100,000
- Principal Investigator, Gyrokinetic Theory and Simulations, DoE, 2010-2011, \$750,000
- Principal Investigator, Maryland Controlled Fusion Research Program, DoE, 2008-2014, \$5,682,000.
- Principal Investigator, SciDAC Center for Simulation of Plasma Microturbulence, DoE, 2008-2014, \$968,000

Principal Investigator, Maryland Controlled Fusion Research Program, DoE, 2017-2019, \$2,175,000

Principal Investigator, Partnership for Multiscale Gyrokinetic Turbulence, DoE (sub through Univ of Texas), 2018-2022, \$800,000

j. Fellowships, Prizes, and Awards

Phi Beta Kappa, 1988.

Highest Honors, College of Natural Science, University of Texas, 1988.

Special Honors in Physics, University of Texas, 1988.

Department of Energy Fusion Postdoctoral Fellowship, 1993-1995.

Fellow, American Physical Society, 2005.

Richard A. Ferrell Distinguished Faculty Fellow, 2008.

E. O. Lawrence Award, 2009.

University of Maryland Distinguished Scholar Teacher, 2010.

University of Maryland Honors College Outstanding Faculty Award, 2017.

k. Reviewing Activities for Journals and Other Learned Publications

Editor (with A. A. Schekochihin), *Journal of Plasma Physics* (2013 - present, Cambridge University Press)

3. Teaching, Mentoring and Advising

a. Courses taught at Maryland

i. General

AMSC 664 - Advanced Scientific Computation II Spring 2003 (4 students)

Physics 161 - General Physics: Mechanics and Particle Dynamics Fall 2003 (100 students)

AMSC 663 - Advanced Scientific Computation I Fall 2003 (10 students)

AMSC 664 - Advanced Scientific Computation II Spring 2004 (10 students)

Physics 762 - Plasma Physics II Spring 2005 (5 students)

Physics 121 - Fundamentals of Physics I (Team taught; Laboratory supervisor) Spring 2006 (~ 300 students)

Physics 122 - Fundamentals of Physics II (Team taught; Laboratory and tutorial supervisor) Spring 2006 (~ 350 students)

AMSC 663 - Advanced Scientific Computation I Fall 2006 (7 students)

Physics 121 - Fundamentals of Physics I (Team taught; Laboratory supervisor) Spring 2007 (289 students)

Physics 122 - Fundamentals of Physics II (Team taught; Laboratory and tutorial supervisor) Spring 2007 (392 students)

AMSC 664 - Advanced Scientific Computation II Spring 2007 (7 students)

Honors 238W - Physics for Decision Makers: The Global Energy Crisis Fall 2007 (17 students).

Physics 106 - Light, Perception, Photography and Visual Phenomena Spring 2008 (108 students).

Honors 100 - Honors Colloquium Fall 2009 (157 students).

Honors 100 - Honors Colloquium Fall 2010 (600 students).

Honors 269N - Nuclear Weapons and Policy Spring 2011 (20 students).

Honors 299Q - Quantum Mechanics for Non-majors Spring 2017 (12 students).

PHYS 132 - Fundamentals of Physics for Biological Sciences Majors II Spring 2017 (112 students).

PHYS 410 - Classical Mechanics Fall 2017 (50 students).

PHYS 132 - Fundamentals of Physics for Biological Sciences Majors II Spring 2018 (92 students).

PHYS 410 - Classical Mechanics, Fall 2018 (covering for McKinney; 57 students)

Honors 299Q - Quantum Mechanics for Non-majors Spring 2019 (7 students).

PHYS 132 - Fundamentals of Physics for Biological Sciences Majors II Spring 2019 (70 students).

b. Course or Curriculum Development

Developed a quantum mechanics course for advanced non-majors in the Honors College in the spring of 2017.

Developed seven living-learning programs in the Honors College (2009-2016).

Worked with Professors Goodman, Rolston and Hammer to develop Physics 105 - Physics for Decision Makers: The Global Energy Crisis. This is a new CORE course in the “Marquee Science” series. The aim of the Marquee courses is to introduce non-majors to the methods and ideas of science, without getting bogged down in specific calculations or techniques. Physics 105 is focused on the science that underlies energy production and global warming. I taught the course the first time it was offered (Fall 2007), as Honors 238W. I meet weekly with Professors Goodman and Rolston, and approximately four times per semester with the Marquee science faculty.

Worked with Professor Stewart to develop AMSC 462, a new course that will be required for undergraduate physics students that wish to obtain a certificate in Computational Physics. Prof. Stewart and I designed the course from scratch. It is a survey of computer science for scientists and engineers. The goal is to enable the student to write efficient, well-organized programs for today’s machines. Topics to be treated are computer organization, computer arithmetic, processes and operating systems, the memory hierarchy, comparison of the Fortran and C families of languages, compilers, the run time environment, memory allocation, preprocessors and portability, and documentation.

Worked with Professor David Levermore to develop and run AMSC 663/664. This is the keystone course for the new graduate program in Scientific Computing. It is a project course, in which students working in a variety of scientific areas design, build and test a suite of scientific software suitable for PhD-level research. This is a team-taught, year-long sequence.

e. Advising (other than Research Direction)

i. Undergraduate: Advising physics students, 2003-present, 3-4 students per year.

ii. Graduate: Advising physics students 2003-present, 3-6 students per year.

f. Advising (Research Direction)

i. Undergraduate Justin Sobota (Spring, 2003, Maryland)

Jake Kirsch (Spring 2003, Maryland)

Mark van Buskirk (Spring 2003, Maryland)

Kevin Schoeffler (Spring, 2003-2005, Maryland)

Ryan McCulley (Spring, 2004, Maryland)

Evan Hoffman (Spring, 2004 - 2006, Maryland)

Samuel Pinkava (Spring, 2005, Maryland)

Elizabeth Terry (Fall 2007, Maryland)

Ammar Hussein (Fall 2007, Maryland)

Kieran Bhatia (Fall 2009, Maryland)

Patrick McKenna (Currently, Maryland)

Students since 2009 not documented here; approx three/year

ii. Master's

Nick Setzer (physics research, Summer 2003)

Timothy Stoltzfuss-Dueck (Princeton student, summer practicum at Maryland, 2003)

Bryan Osborn (AMSC, finished in Spring 2004)

James Cooley (AMSC, finished in Spring 2004)

Tamara Singleton (AMSC, received PhD 2011)

J. Baumgaertel (Princeton student, summer practicum at Maryland, 2008)

J. Hillesheim (UCLA student, practicum at Maryland, 2009)

iii. Doctoral

W. A. Tillotson (Maryland, physics, defended 2007)

I. Broemstrup (Maryland, physics, defended Summer 2008)

M. Barnes (Maryland, physics, defended Fall 2008)

K. Gustafson (Maryland, physics, defended Fall 2009)

K. Despain (Maryland, physics, defended Summer 2010)

A. Kanekar (Maryland, physics, defended Fall 2014)

G. Wilkie (Maryland, physics, defended Fall 2015)

N. Joiner (Imperial College, physics)

N. Loureiro (Imperial College, physics)

D. Applegate (Imperial College, physics)

G. J. Wilkie (Maryland, physics)

E. J. Paul (Maryland, physics)
M. Martin (Maryland, physics)
J. Juno (Maryland, physics)
R. Gaul (Maryland, physics)

iv. Post-Doctoral

Angus Macnab (2003-2005)
Tomoya Tatsuno (2003-2006)
George Stantchev (2004-2008)
Gregory Howes (2004-2008)
Nuno Loureiro (2005-2007)
Fulvio Militello (2005-2007)
Ryusuke Numata (2008-2010)
Gabriel Plunk (2008-2010)
Jason TenBarge (promoted to staff, 2015) (2013-2017)
Matt Landreman (promoted to staff, 2015) (2013-present)
Alessandro Geraldini (2018 - present)
Ian Abel (promoted to staff, early 2019) (2018 - present)

4. Service

a. Professional

i. Offices and committee memberships held in professional organizations

Member, Executive Committee of Numerical Tokamak Turbulence Project, (1995-1999).
Chair, APS Division of Plasma Physics Human Rights Committee (1995-1997).
Chair, APS Committee for the International Freedom of Scientists, 1997-1998. Member, (1996-98).
Chair, Transport Task Force Modeling Group (1998-2001); Member, TTF Executive Committee (1998-2006).
Lecturer and Assistant Organizer, Computational Physics Course, Abdus Salam International Centre for Theoretical Physics, Plasma Physics Autumn College, Trieste, (2001, 2003).
Member, Program Advisory Committee, National Spherical Torus Experiment, (2000-2004).
Member, Scientific Program Committee, EU-US Turbulence Task Force Workshop, September (2004).
Organizer, “Numerical Methods for Plasma Astrophysics: From Particle Kinetics to MHD”, joint CSCAMM-PicSIE (Princeton Institute for Computational Science and Engineering) workshops, (2004).
Director, Workshop on Theoretical Plasma Physics, Abdus Salam International Centre for Theoretical Physics, July (2004).
Chair, APS-DPP Public Information Committee, (2003-2005).
Member, APS Panel on Public Affairs, (2005-2007); Chair of National Security Committee (2007).

Sherwood International Theory Conference Executive Committee (2007-2010).
University Fusion Association Executive Committee (2007-2010).
Member, Spherical Torus Coordinating Committee (2008-2010).
Member, Princeton Plasma Physics Laboratory Advisory Board (2009-present).
Member, United States Liaison Committee, International Union for Pure and Applied Physics (2009-present).
National Research Council Plasma Science Committee (2010-present).
National Research Council Plasma Science Committee Chair (2014-2018).
Oversaw review process for the NRC report on Burning Plasma Research (2018).
Co-chair, DOE/OFES Roundtable on Quantum Information Science (2018)
Sherwood International Theory Conference, Chair of Program Committee (2019)
Co-organized US-Japan Joint Institute of Fusion Theory Workshop, *Multiscale Simulations in Plasma Physics*, Inuyama, Japan (2019)

iv. **Other non-University committees, commissions, panels, etc.**

Member, ITER Working Group on Confinement, 1995-1997.
Panel member, “Future Directions of Plasma Physics”, 1998 European Physical Society (Prague).
Member, NAS/NRC committee conducting decadal survey of plasma science, “Plasma 2010.”
Scientific Advisory Committee, PPPL (2008-2011)

vi. **Paid Consultancies**

Consulted for United Kingdom Atomic Energy Agency, 2001-2002.

b. Campus

i. Departmental

Member, High Performance Computing Advisory Board, Imperial College, London (2001-2002).
Member, Physics Department Web Committee, (Maryland) 2002-2003.
Member, Applied Mathematics and Scientific Computation Graduate Committee, (Maryland) Fall 2003-2005.
Member, Physics Department Salary Committee, (Maryland) 2003-2005.
Member, Physics Department Computational Physics Committee, (Maryland) 2003-2004.
Member, Physics Department Qualifier Committee, (Maryland) 2005-2007.
Member, Physics Department Appointments, Promotions and Tenure Committee.
Member, Physics Department Priorities Committee.
Chair, Physics Department Graduate Teaching Assistant Committee.
Member, University of Maryland Climate Action Plan Working Group (2007-2009).
Chair, CSCAMM Education Committee, 2008.
Director, Maryland Center for Multiscale Plasma Dynamics (2004-2009).

Acting Director, Institute for Research in Electronics and Applied Physics, 7/08-12/08.

Member, PhD Defense Committees: M. Oczkowski (2003), D. Sisan (2004), W. Tillotson (2007, Chair), T. Nakamura (2007), S-W Ng (2007), R. Shuttleworth (2007), C. Mitchell (2007), B. Nam (2007), I. Broemstrup (2008, Chair), M. Barnes (2008, Chair), C. Groer (2008), A. York (2008), J. Vernaleo (2008), R. Fletcher (2008), R. Clary (2009), Christos Papadopoulos (2009), K. Gustafson (2009), K. Despain (2010), S. Triana (2010), N. Zazworka (2010), D. Zimmerman (2010).

PhD Defense Committees since 2010 not documented here.

Physics Department Salary Committee (2016-2018; Chair (improbably!) 2018).

d. Service Awards and Honors

Award for Creative Ideas in International Education, CIEE, 2000.

Outstanding Young Texas Ex, 1998.

Most Outstanding Male Student, University of Texas, 1988.

Friar Society, 1988.