JOHN DAYTON TOVAR, PH.D.

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RESEARCH INTERESTS

Materials-oriented synthetic organic chemistry, pi-conjugated molecules and polymers, supramolecular chemistry, organic electronics, biomimetic electronic materials.

ACADEMIC APPOINTMENTS

July 2016 — Professor, Department of Chemistry, Department of Materials Science and Engineering, Johns Hopkins University

July 2012 — Associate Professor, Department of Chemistry, Department of Materials Science and Engineering, Johns Hopkins University

April 2009 — Assistant Professor, Department of Materials Science and Engineering
Johns Hopkins University (Joint appointment)

July 2005 — Assistant Professor, Department of Chemistry
Johns Hopkins University

2002 - 2005 — (Baxter) Postdoctoral Fellow, Department of Materials Science and Engineering
Northwestern University (with Professors Samuel I. Stupp and Mark C. Hersam)

EDUCATION

May 2002 — Ph.D., Organic Chemistry (with Professor Timothy M. Swager)
Massachusetts Institute of Technology
Thesis: “Synthesis and Utility of Electronically Diverse Polycyclic Aromatics”

March 1997 — B.S., Chemistry
University of California, Los Angeles

AWARDS AND HONORS

Visiting Professor, Ministry of Science and Technology, Taiwan (2019)
Invitational Fellowship, Japan Society for the Promotion of Science (2019)
Journal of Physical Organic Chemistry “Early Excellence” profilee (2012)
Thieme Chemistry Journal Award (2010)
NSF CAREER Award (2007)
Princeton Applied Research New Young Investigator Award (2004)
Baxter-IBNAM Early Career Development Award, Northwestern (2003)
Wyeth-Ayerst Scholar, MIT (2001)

Departmental Outstanding Teaching Award, MIT (1998)
Hypercube Scholar and Departmental High Honors, UCLA (1997)
Golden Key National Honor Society, UCLA (1995)
Valedictorian, San Dimas High School (1993)

PROFESSIONAL SERVICE

Meeting (co)organizer: 2012 Mid-Atlantic Regional Meeting (Contemporary Organic Materials); 2015 Pacifichem (Conjugated Polymers for Biological Applications, with Hsiao-hua Yu and Shu Wang); 2017 Fall ACS meeting (ORGN: From bioinspired to biocompatible material design for organic electronics, with Ron Castellano); 2021 Pacifichem (Functional Pi-Conjugated Molecules for Biological Applications, with Hsiao-hua Yu and Shu Wang); 2021 Pacifichem (Hierarchical self-assembly and application of functional π-systems, with Roxanne Kieltyka, Gustavo Fernandez, Myongsoo Lee, Kazunori Sugiyasu and Shiki Yagai).

Organizing committee: 8th International Symposium on Macrocyclic and Supramolecular Chemistry, 2013 (Crystal City, VA); 17th International Symposium on Novel Aromatic Compounds, 2017 (Stony Brook, NY)

Editorial activities: Editorial Advisory Board member for *Macromolecules* (2016-2019) and *ACS Macro Letters* (2016-2019); Guest editor, *Organic and Biomolecular Chemistry* (Special issue on Peptide Materials, 2017, with Honggang Cui and Dave Adams)

CURRENT FUNDING AND SUPPORT ($3,295,000)

National Science Foundation (DMREF)
"Self-assembled peptide-pi-electron supramolecular polymers for bioinspired energy harvesting, transport and management"
October 1, 2017 – September 30, 2021 ($1,600,000, DMR-1728947, JDT lead PI, collaboration with H. E. Katz at JHU and A. L. Ferguson at UIUC)

Department of Energy (BES Materials Chemistry)
"Exploration of radial conjugation pathways in pi-electron materials"
October 1, 2018 – March 31, 2022 ($1,095,000, DE-SC0019017, JDT lead PI, collaboration with R. Jasti at U. Oregon and M. Kertesz at Georgetown)

National Science Foundation (CHE Macromolecular, Supramolecular and Nanochemistry)
"Pendant Photochromic Switches Enabling Fluxional Macromolecular Pi-Electronics"
July 1, 2020 – June 30, 2023 ($600,000, CHE-2002922, JDT lead PI, collaboration with A. E. Bragg at JHU)

PRIOR FUNDING AND SUPPORT ($4,218,000)

Petroleum Research Fund (administered by the American Chemical Society)
"Unusual Aromaticity and Organic Semiconductor Performance"
Feb 2007 – Sept 2009 ($40,000, PRF-45738-G7, JDT sole PI)

Institute for NanoBioTechnology (JHU)
"Supramolecular bioelectronic nanostructures for use in neural tissue engineering"

May 2010 – April 2011 ($20,000, JDT lead PI)
Collaboration with H.-Q. Mao (JHU Materials Science and Engineering)

National Science Foundation (DMR Polymers EAGER)
"Optoelectronic Supramolecular Block-Copolymer Assemblies Aided by Donor-Acceptor Interactions,"
Sept 2009 – Aug 2012 ($296,000, DMR-0947897, JDT co-PI)

National Science Foundation (DMR Polymers CAREER)
"Regulating charge transport through pi-conjugated electronic materials"
Apr 2007 – Mar 2013 ($473,000, DMR-0644727, JDT sole PI)

Department of Energy (BES Biomolecular Materials)
"Self-Assembly of Pi-Conjugated Peptides in Aqueous Environments Leading to Energy Transporting Bioelectronic Nanostructures"
Sept 2010 – Aug 2013 ($590,000, DE-SC0004857, JDT sole PI)
Sept 2013 – Aug 2016 ($810,000, DE-SC0004857, JDT lead PI, collaboration with H. E. Katz at JHU and A. L. Ferguson at UIUC)

National Science Foundation (DMR Polymers)
"Locally unusual and tunable aromatic rings for pi-conjugated polymers"
July 2012 – June 2016 ($359,000, DMR-1207259, JDT sole PI)

National Science Foundation (DMR Biomaterials)
"Nanoscale electric fields in self-assembled optoelectronic biomaterials"
July 15, 2014 – June 30, 2017 ($600,000, DMR-1407493, JDT lead PI, collaboration with H. E. Katz and H.-Q. Mao at JHU)

Johns Hopkins University (Discovery Award)
"Engineering plasticity after stroke to promote recovery using peptide pi-electron hydrogels"
July 1, 2017 – June 30, 2018 ($100,000, JDT co-PI, collaboration with R. Felling and S. Zeiler at JHU School of Medicine)

National Science Foundation (CHE Chemical Structure, Dynamics and Mechanism B)
"Encouraging pi-electron delocalization through boron-based heteroaromatic subunits"
May 1, 2015 – April 30, 2019 ($390,000, CHE-1464798, JDT sole PI)

National Science Foundation (CHE Macromolecular, Supramolecular and Nanochemistry)
"Fluxional macromolecular pi-electronics via rational manipulation of aromaticity and spin"
August 1, 2016 – July 31, 2019 ($540,000, CHE-1607821, JDT lead PI, collaboration with A. E. Bragg at JHU)

INVITED LECTURES AND PRESENTATIONS (AS PI AFTER JULY 2005)

Future: Bioderived Electronics 2022 (Ein Gedi, Israel), 17th International Meeting on Boron Chemistry (Rennes, France)

2021: American Chemical Society Spring Meeting (POLY, virtual), Institute of Electrical and Electronics Engineers Nano Meeting (NanoBioelectronics, virtual)

2020: University of Miami, American Chemical Society Spring Meeting (POLY, Philadelphia, canceled), 17th International Meeting on Boron Chemistry (Rennes, France, postponed), Institute of Electrical and Electronics Engineers Nano Meeting (Montreal, postponed), American Chemical Society Fall Meeting (ORGN, virtual)

2019: Nagoya University, University of Tokyo, Tokyo Institute of Technology, RIKEN Advanced Science Institute (Japan), Hokkaido University, "Core-to-Core Joint Symposium" at Nagoya University, Osaka University, Kyoto University, American Chemical Society Spring Meeting (PMSE, Orlando), University of Glasgow, University of Liverpool, University of Bristol, Cambridge University, Imperial College London, Academia Sinica (Taiwan), National Cheng Kung University, National Chiao Tung University, National Taiwan University, Friedrich-Alexander-Universität Erlangen-Nürnberg (Germany)

2018: Temple University (PA); 101st Canadian Chemistry Conference (Edmonton); 2nd "From Carbon-Rich Molecules to Carbon-Based Materials" conference (Nassau, The Bahamas); American Chemical Society Fall meeting (Boston); Lehigh University (PA); University of Massachusetts, Amherst; "Using nanotechnology to integrate living and non-living matter" symposium (Advanced Science Research Center, City University of New York); "Aromaticity 2018" conference (Riviera Maya, Mexico)

2017: American Chemical Society Spring meeting (San Francisco) and Fall meeting (Washington D.C.), Johns Hopkins University, University of Florida, Materials Research Society Fall meeting (Boston)

2016: Pacific Northwest National Laboratory, University of California Santa Cruz, University of Alabama, Georgetown University (DC), 99th Canadian Chemistry Conference (2 talks, Halifax), Sun Yat-Sen University (Guangzhou, China), Warwick Polymer Conference (England), University of Liverpool (England), Uppsala University (Sweden), Stony Brook University (NY), University of Maryland, Harvard University (MA), Materials Research Society Fall Meeting (Boston)

2015: American Chemical Society Spring Meeting (COLL, Denver), 12th Foundations of Nanoscience meeting (Snowbird, Utah), 98th Canadian Chemistry Conference (Macromolecular Sci Eng, Ottawa), 24th American Peptide Society Meeting (Orlando, FL), FASEB SRC meeting "Molecular Mechanisms and Physiological Consequences of Protein Aggregation" (Palm Beach, FL), International Conference on Materials for Advanced Technologies (Singapore), "Pi-day in Málaga" at the University of Málaga (Spain), University of Toronto (Canada), University of Calgary (Canada), Messiah College (PA), Materials Research Society Fall Meeting (CC, Boston), Pacifichem (Organic session 263, Honolulu)

2014: Iowa State University (Materials Science), Iowa State University (Chemistry), Trinity College (CT), Sandia National Laboratory (NM), University of New Mexico, Functional Peptide and Protein Nanostructures workshop (Jerusalem, Israel), American Chemical Society Fall Meeting (COLL and PMSE, San Francisco), 1st "From Carbon-Rich Molecules to Carbon-Based Materials" conference (El Jadida, Morocco), Southeast Regional Meeting of the American Chemical Society (Nashville, TN), University of California, Irvine, University of Kentucky

2013: US-Korea Workshop on Nanotechnology for the Environment (Seoul, Korea); American Chemical Society Spring Meeting (POLY, New Orleans); Materials Research Society Spring

Meeting (Symposium QQ, San Francisco); Chinese University of Hong Kong; 15th International Symposium on Novel Aromatics (Taipei, Taiwan); American Chemical Society Fall Meeting (COLL, Indianapolis, IN); Calvin College (MI); Hope College (MI); Emory University (GA)

2012: Columbia University (NY); Washington College (MD); Lebanon Valley College (PA); International Conference of Young Researchers on Advanced Materials (Singapore); Argonne National Laboratory (IL); Marquette University (WI); Los Alamos National Laboratory (NM)

2011: Rutgers University, Newark (NJ); 14th International Symposium on Novel Aromatics (Eugene, OR); Massachusetts Institute of Technology; Boston College (MA); University of Delaware; University of Massachusetts, Amherst; Case Western Reserve University (OH); University of Colorado, Boulder; University of Florida; Florida State University

2010: Carnegie Mellon University (PA); University of California, Davis; Stanford University (CA); Texas A&M University; University of Oregon; North Carolina Polymer Discussion Group; University of Michigan; Louisiana State University; Ohio State University; Indiana University

2009: 11th Pacific Polymer Conference (Cairns, Australia); University of California, Los Angeles; George Mason University (VA); Juniata College (PA); Vanderbilt University (TN); University of Maryland; University of Tokyo; National Institute for Materials Science (Tsukuba, Japan); RIKEN Advanced Science Institute (Wako, Japan); Materials Research Society of Singapore, National University of Singapore

2008: Randolph-Macon College (VA); Hampden-Sydney College (VA); 8th International Symposium on Functional π-Electron Systems (Fp8: Graz, Austria); Organic Structures and Properties Gordon Research Conference (short talk)

2007: University of the Sciences in Philadelphia (PA); Colgate University (NY); NSF Physical Organic Chemistry Workshop (Basin Harbor, VT); 39th ACS Middle Atlantic Regional Meeting (Alan G. MacDiarmid Memorial Symposium).

2006: Georgetown University (Washington, D.C.); ISIS-ULP and BASF (Strasbourg, France)

PUBLICATIONS (PEER-REVIEWED)

[* publications from research prior to current appointment, undergraduate co-authors in bold]
80 from independent research at JHU published, in press or accepted.
4 from postdoctoral research; 7 from doctoral research; 1 from undergraduate research

92. S. S. Panda, K. Shmilovich, N. Herringer, N. Marin, A. L. Ferguson and J. D. Tovar, "Computationally Guided Tuning of Peptide-Conjugated Perylene Diimide Self-Assembly," in ***Langmuir,*** 2021, *in press.* (DOI: 10.1021/acs.langmuir.1c01213)
91. S. S. Panda and J. D. Tovar, "Aqueous Self-assembly of Peptide-Diketopyrrolopyrrole Conjugates with Variation of N-alkyl Side Chain and π-Core Lengths, invited for the special issue "Supramolecular Optoelectronic Materials" by ***Organic Materials****,* 2021 (3) 353-361. (DOI: 10.1055/a-1503-5912)
90. J. D. Tovar, "Repurposing aromaticity for organic electronics: making, breaking and stacking pi-circuits," invited by the ***Journal of the Chinese Chemical Society***, 2021 (68) 51-58. (DOI: 10.1002/jccs.202000524)

89. S. A. Harry, F. Ghorbani, J. Capilato, C. R. Pitts, J. Joram, G. M. Peters, J. D. Tovar, I. Smajlagic, M. Siegler, T. Dudding and T. Lectka, "Carbonyl-Directed Aliphatic Fluorination: A Special Type of Hydrogen Atom Transfer Beats Out Norrish II," in the ***Journal of the American Chemical Society,*** 2020 (142) 14710-14724. (DOI: 10.1021/jacs.0c07004)
88. J. P. Dibble, **C. Troyano-Valls** and J. D. Tovar, "A tale of three hydrophobicities: Impact of constitutional isomerism on nanostructure evolution and electronic communication in pi-conjugated peptides," in ***Macromolecules,*** 2020 (53) 7263-7273. (DOI: 10.1021/acs.macromol.0c01492)
87. S. S. Panda, K. Shmilovich, A. L. Ferguson and J. D. Tovar, "Computationally guided tuning of amino acid configuration influences the chiroptical properties of supramolecular peptide-pi-peptide nanostructures," in ***Langmuir***, 2020 (36) 6782-6792. (DOI: 10.1021/acs.langmuir.0c00961)
86. G. Grover, G. M. Peters, J. D. Tovar, M. Kertesz, "Quinonoid vs aromatic structures of heteroconjugated polymers from oligomer calculations," in ***Physical Chemistry Chemical Physics***, 2020 (22) 11431-11439. (DOI: 10.1039/D0CP00606H)
85. E. R. Jira, K. Shmilovich, T. S. Kale, A. L. Ferguson, J. D. Tovar, C. M. Schroeder, "Effect of core oligomer length on the phase behavior and assembly of π-conjugated peptides," in ***ACS Applied Materials & Interfaces,*** 2020 (12) 20722-20732. (DOI: 10.1021/acsami.0c02095)
84. K. Shmilovich, R. A. Mansbach, H. Sidky, O. E. Dunne, S. S. Panda, J. D. Tovar, A. L. Ferguson, "Discovery of self-assembling pi-conjugated peptides by active learning-directed coarse-grained molecular simulation," in the ***Journal of Physical Chemistry B,*** 2020 (124)3873-3891. (DOI: 10.1021/acs.jpcb.0c00708)
83. T. Lee, S. S. Panda, J. D. Tovar and H. E. Katz, "Unusually conductive organic-inorganic hybrid nanostructures derived from bio-inspired mineralization of peptide/pi-electron assemblies," in ***ACS Nano,*** 2020 (14) 1846-1855. (DOI: 10.1021/acsnano.9b07911)
82. C. R. Honick, G. M. Peters, J. D. Tovar and A. E. Bragg, "Core structure dependence of cycloreversion dynamics in diarylethene analogs," in ***Physical Chemistry Chemical Physics,*** 2020 (22) 3314-3328. (DOI: 10.1039/C9CP05797H)
81. G. M. Peters, G. Grover, R. Maust, C. Colwell, H. Bates, W. Edgell, R. Jasti, M. Kertesz, and J. D. Tovar, "Linear and radial conjugation in extended pi-electron systems," in the ***Journal of the American Chemical Society,*** 2020 (142) 2293-2300. (DOI: 10.1021/jacs.9b10785)
80. M. Baghernejad, C. van Dyck, J. Bergfield, D. R. Levine, A. Gubicza, J. D. Tovar, M. Calame, P. Broekmann and W. Hong, "Quantum interference enhanced chemical responsivity in single-molecule dithienoborepin junctions," in ***Chemistry - A European Journal,*** 2019 (25) 15141-15146. (DOI: 10.1002/chem.201903315)
79. B. A. Thurston, E. P. Shapera, J. D. Tovar, A. Schleife and A. L. Ferguson, "Revealing the Sequence-Structure-Electronic Property Relation of Self-Assembling π-Conjugated Oligopeptides by Molecular and Quantum Mechanical Modeling," in ***Langmuir,*** 2019 (35) 15221-15231. (DOI: 10.1021/acs.langmuir.9b02593)
78. J. Kim, J. Oh, S. Park, J. L. Zafra, J. R. DeFrancisco, D. Casanova, M. Lim, J. D. Tovar, J. Casado and D. Kim, "Two-Electron Transfer Stabilized by Excited-State Aromatization," in ***Nature Communications,*** 2019 (10) 4983. (DOI: 10.1038/s41467-019-12986-w)
77. S. S. Panda, K. Shmilovich, A. L. Ferguson and J. D. Tovar, "Controlling supramolecular chirality in peptide-pi-peptide networks by variation of alkyl spacer length," in ***Langmuir,*** 2019 (35) 14060-14073. (DOI: 10.1021/acs.langmuir.9b02683)
76. J. D. Young, C. R. Honick, J. Zhou, C. R. Pitts, F. Ghorbani, G. M. Peters, J. D. Tovar, T. Lectka, A. E. Bragg, "Energy- and conformer-dependent excited-state relaxation of an E/Z

photoswitchable thienyl-ethene," in ***Physical Chemistry Chemical Physics*** 2019 (21) 14440-14452. (DOI: 10.1039/C9CP01226E).

75. G. M. Peters and J. D. Tovar, "Pendant Photochromic Conjugated Polymers Incorporating a Highly Functionalizable Thieno[3,4-b]thiophene Switching Motif," in the ***Journal of the American Chemical Society,*** 2019 (141) 3146-3152. (DOI: 10.1021/jacs.8b12617)
74. R. E. Messersmith and J. D. Tovar, "Borepin rings as 'sigma-free' reporters of aromaticity within polycyclic aromatic scaffolds," in the ***Journal of Physical Chemistry A,*** 2019 (123) 881-888. (DOI: 10.1021/acs.jpca.9b00125)
73. T. S. Kale,* H. A. M. Ardoña,* **A. Ertel** and J. D. Tovar, "Torsional impacts on quaterthiophene segments confined within peptidic nanostructures," in ***Langmuir,*** 2019 (35) 2270-2282. (DOI: 10.1021/acs.langmuir.8b03708)
72. R. E. Messersmith, M. A. Siegler and J. D. Tovar, "A heptacyclic heptacycle: A doubly naphtho[b]thiophene fused borepin," *invited by* ***Synlett*** (part of a Cluster issue on Synthesis of Materials), 2018 (29) 2499-2502. (DOI: 10.1055/s-0037-1610163)
71. J. R. DeFrancisco, G. L. Espejo, J. L. Zafra, S. Yadav, R. E. Messersmith, C. J. Gómez-García, H. Ottosson, J. Casado and J. D. Tovar, "Torsional bias as a strategy to tune singlet-triplet gaps in organic diradicals," in the ***Journal of Physical Chemistry C,*** 2018 (122) 12148-12157. (DOI: 10.1021/acs.jpcc.8b01905)
70. S. S. Panda, H. E. Katz and J. D. Tovar, "Solid-state electrical applications of protein and peptide-based nanomaterials," invited by ***Chemical Society Reviews*** (part of a special issue on "Peptide and Protein Nanotechnology"), 2018 (14) 3640-3658. (DOI: 10.1039/C7CS00817A)
69. J. D. Tovar, "Photon management in supramolecular peptide nanomaterials," invited by ***Bioinspiration and Biomimetics***, 2018 (13) 015004 (part of a special issue on "Biophotonics and biologically inspired photonics"). (DOI: 10.1088/1748-3190/aa9685)
68. R. E. Messersmith, S. Yadav, M. A. Siegler, H. Ottosson and J. D. Tovar, "Benzo[b]thiophene fusion enhances local borepin aromaticity in polycyclic heteroaromatic compounds," in the ***Journal of Organic Chemistry,*** 2017 (82) 13440-13448. (DOI: 10.1021/acs.joc.7b02512)
67. Y. Zhou, B. Li, S. Li, H. A. M. Ardoña, W. L. Wilson, J. D. Tovar and C. M. Schroeder, "Concentration-driven assembly and sol-gel transition of pi-conjugated oligopeptides," in ***ACS Central Science,*** 2017 (3) 986-994. (DOI: 10.1021/acscentsci.7b00260)
66. T. S. Kale, J. E. Marine and J. D. Tovar, "Self-assembly and associated photophysics of dendron-appended peptide-pi-peptide triblock macromolecules," in ***Macromolecules,*** 2017 (50) 5315-5322. (DOI: 10.1021/acs.macromol.7b00821)
65. H. A. M. Ardoña,* T. S. Kale,* **A. Ertel** and J. D. Tovar, "Non-resonant and local field effects on the photophysics of oligo(phenylenevinylene) segments within peptidic nanostructures," in ***Langmuir,*** 2017 (33) 7435-7445. (DOI: 10.1021/acs.langmuir.7b01023)
64. H. A. M. Ardoña, E. R. Draper, F. Citossi, M. Wallace, L. Serpell, D. J. Adams, J. D. Tovar, "Kinetically-controlled coassembly of multichromophoric peptide hydrogelators and the impacts on energy transport," in the ***Journal of the American Chemical Society,*** 2017 (139) 8685-8692. (DOI: 10.1021/jacs.7b04006)
63. A. M. Sanders, T. S. Kale, H. E. Katz and J. D. Tovar, "Solid-phase synthesis of self-assembling multivalent pi-conjugated peptides," in ***ACS Omega,*** 2017 (2) 409-419. (DOI: 10.1021/acsomega.6b00414)
62. B. Li, S. Li, Y. Zhou, H. A. M. Ardoña, L. R. Valverde, W. L. Wilson, J. D. Tovar and C. M. Schroeder, "Non-equilibrium self-assembly of pi-conjugated oligopeptides in solution," in

ACS Applied Materials & Interfaces, 2017 (9) 3977-3984. (DOI: 10.1021/acsami.6b15068)

61. W. Liyanage, H. A. M. Ardoña, H.-Q. Mao and J. D. Tovar, "Cross-linking approaches to tune the mechanical properties of peptide-pi-electron based hydrogels," invited by ***Bioconjugate Chemistry***, 2017 (28) 751-759 (part of a special issue on "Peptide conjugates for biological applications"). (DOI: 10.1021/acs.bioconjchem.6b00593)
60. D. R. Levine, R. E. Messersmith, M. A. Siegler and J. D. Tovar, "Ring fusion isomers of dithienoborepins: perturbations of electronic structure, aromaticity and reactivity in boron-containing polycyclic heteroaromatics," invited by the ***Canadian Journal of Chemistry*** as part of a special issue in honor of Professor Reginald Mitchell, 2017 (95) 381-389. (DOI: 10.1139/cjc-2016-0493)
59. T. S. Kale and J. D. Tovar, "Regulation of Peptide-π-Peptide Nanostructure Bundling: The Impact of "Cruciform" π-Electron Segments," invited as part of a Symposium-in-Print in honor of the retirement of Professor Gary H. Posner, ***Tetrahedron,*** 2016 (72) 6084-6090. (DOI:10.1016/j.tet.2016.07.064)
    NOTE: correction posted 24 January 2017 (DOI:10.1016/j.tet.2017.01.033)
58. R. E. Messersmith, M. A. Siegler and J. D. Tovar, "Aromaticity competition in differentially-fused borepin containing polycyclic aromatics," in the ***Journal of Organic Chemistry,*** 2016 (81), 5595-5605. (DOI: 10.1021/acs.joc.6b00927)
57. A. M. Sanders, T. J. Magnanelli, A. E. Bragg and J. D. Tovar, "Photoinduced electron transfer within supramolecular donor-acceptor peptide nanostructures under aqueous conditions," in the ***Journal of the American Chemical Society,*** 2016 (138) 3362-3370. (DOI: 10.1021/jacs.5b12001)
56. A. M. Fraind, L. R. Ryzhkov and J. D. Tovar, "Chain dynamics, relaxation times and conductivities of bithiophene-acene copolymers measured using high-frequency saturation transfer EPR," in the ***Journal of Physical Chemistry B,*** 2016 (120) 1033-1039. (DOI: 10.1021/acs.jpcb.5b11212)
55. B. A. Thurston, J. D. Tovar and A. L. Ferguson, "Thermodynamics, morphology, and kinetics of early-stage self-assembly of π-conjugated oligopeptides," in ***Molecular Simulations***, 2016 (42) 955-975. (DOI: 10.1080/08927022.2015.1125997)
54. K. Besar, H. A. M. Ardoña, J. D. Tovar and H. E. Katz, "Demonstration of hole transport and voltage equilibration in self-assembled pi-conjugated peptide nanostructures using field-effect transistor architectures," in ***ACS Nano,*** 2015 (9) 12401-12409. (DOI: 10.1021/acsnano.5b05752)
53. H. A. M. Ardoña and J. D. Tovar, "Peptide pi-electron conjugates: organic electronics for biology?" invited cover article by ***Bioconjugate Chemistry,*** 2015 (26) 2290-2302. (DOI: 10.1021/acs.bioconjchem.5b00497)
52. B. C. Streifel, J. L. Zafra, G. L. Espejo, C. J. Gómez-García, J. Casado and J. D. Tovar, "An unusually small singlet-triplet gap in a quinoidal 1,6-methano[10]annulene due to Baird's 4n pi-electron triplet stabilization," inside cover article in ***Angewandte Chemie International Edition,*** 2015 (54) 5888-5893. (DOI: 10.1002/anie.201500879)
    NOTE: correction posted 28 July 2016 (DOI: 10.1002/anie.201605796)
51. H. A. M. Ardoña, K. Besar, **M. Togninalli**, H. E. Katz and J. D. Tovar, "Sequence-dependent mechanical, photophysical and electrical properties of pi-conjugated peptide hydrogelators," in the ***Journal of Materials Chemistry C,*** 2015 (3) 6505-6514 (part of a special web-themed issue on "Bioelectronics"). (DOI: 10.1039/C5TC00100E)
50. R. E. Messersmith and J. D. Tovar, "Assessment of the aromaticity of borepin rings by spectroscopic, crystallographic and computational methods: a historical overview," cover

article in the ***Journal of Physical Organic Chemistry***, 2015 (28) 378-387. (DOI: 10.1002/poc.3422)

49. J. D. Tovar, "Peptide nanostructures with pi-ways: photophysical consequences of peptide/pi-electron molecular self-assembly," invited by the ***Israel Journal of Chemistry*** 2015 (55) 622-627 (part of a special issue on Functional Peptide and Protein Nanostructures). (DOI: 10.1002/ijch.201400161)
48. H. A. M. Ardoña and J. D. Tovar, "Energy transfer within responsive pi-conjugated peptide-based coassembled nanostructures in aqueous environments," in ***Chemical Science,*** 2015 (6) 1474-1484 (DOI: 10.1039/C4SC03122A)
47. B. D. Wall, **Y. Zhou, S. Mei**, H. A. M. Ardoña, A. L. Ferguson and J. D. Tovar, "Variation of formal hydrogen bonding networks within electronically delocalized pi-conjugated oligopeptide nanostructures," in ***Langmuir***, 2014 (30) 11375-11385. (DOI: 10.1021/la501999g)
46. B. C. Streifel, J. F. Martinez-Hardigree, H. E. Katz and J. D. Tovar, "Heteroaromatic variation in amorphous 1,6-methano[10]annulene-based charge-transporting organic semiconductors," in the ***Journal of Materials Chemistry C***, 2014 (2) 7851-7858. (DOI: 10.1039/c4tc01326c)
45. B. D. Wall, A. E. Zacca, A. M. Sanders, W. L. Wilson, A. L. Ferguson and J. D. Tovar, "Supramolecular polymorphism: Tunable electronic interactions within pi-conjugated peptide nanostructures dictated by primary amino acid sequence," in ***Langmuir,*** 2014 (30) 5946-5956. (DOI: 10.1021/la500222y)
44. D. R. Levine, M. A. Siegler and J. D. Tovar, "Thiophene-fused borepins as directly functionalizable boron-containing π-electron systems," in the ***Journal of the American Chemical Society,*** 2014 (136) 7132-7139. (DOI: 10.1021/ja502644e)
43. J. D. Tovar, "Prospecting in Hückel space: from Hinokitiol to non-benzenoid organic electronic materials," invited by ***The Chemical Record*** as an introductory essay for the *Tetsuo Nozoe Autograph Book* project, 2014 (14) 214-225. (DOI: 10.1002/tcr.201300034)
42. A. M. Sanders and J. D. Tovar, "Solid-phase Pd-catalyzed cross-coupling methods for the construction of pi-conjugated peptide nanomaterials," in ***Supramolecular Chemistry,*** 2014 (26) 259-266. (DOI: 10.1080/10610278.2013.852675)
41. A. B. Marciel, M. Tanyeri, B. D. Wall, J. D. Tovar, C. M. Schroeder, W. L. Wilson, "Fluidic-directed assembly of aligned oligopeptides with π-conjugated cores," in ***Advanced Materials,*** 2013 (25) 6398-6404. (DOI: 10.1002/adma.201302496)
40. S. R. Diegelmann and J. D. Tovar, "Polydiacetylene-peptide one-dimensional nanomaterials," invited as a Feature Article by ***Macromolecular Rapid Communications,*** 2013 (34) 1343-1350. (DOI: 10.1002/marc.201300423)
39. A. M. Fraind, G. Sini, C. Risko, L. R. Ryzhkov, J.-L. Brédas and J. D. Tovar, "Charge delocalization through benzene, naphthalene, and anthracene bridges in pi-conjugated oligomers: an experimental and quantum chemical study," in the ***Journal of Physical Chemistry B***, 2013 (117) 6304-6317. (DOI: 10.1021/jp401448a)
38. J. D. Tovar, "Supramolecular construction of optoelectronic biomaterials," invited by ***Accounts of Chemical Research***, 2013 (46) 1527-1537. (DOI: 10.1021/ar3002969)
37. D. Hagaman, J. Gredzik, P. A. Peart, J. D. Tovar, A. Sidorenko, "Block copolymer supramolecular assembly using a precursor to a novel conjugated polymer," ***Polymer Chemistry,*** 2013 (4) 1482-1490. (DOI: 10.1039/C2PY20680C)
36. A. M. Sanders, T. J. Dawidcyzk, H. E. Katz and J. D. Tovar, "Peptide-based supramolecular semiconductor nanomaterials via Pd-catalyzed solid-phase 'dimerizations'," in ***ACS Macro Letters***, 2012 (1) 1326-1329. (DOI: 10.1021/mz3004665) NOTE: correction posted 3 December 2012 (DOI: 10.1021/mz300622w)

35. B. C. Streifel, P. A. Peart, J. F. Martinez-Hardigree, H. E. Katz and J. D. Tovar, "Torsional influences within disordered organic electronic materials based upon non-benzenoid 1,6-methano[10]annulene rings," in ***Macromolecules***, 2012 (45) 7339-7349. (DOI: 10.1021/ma301408w)
34. D. R. Levine, A. Caruso Jr., M. A. Siegler and J. D. Tovar, "Meta-*B*-entacenes: new polycyclic aromatics incorporating two fused borepin rings," in ***Chemical Communications***, 2012 (48) 6256-6258 (part of a special web-themed issue on "Aromaticity"). (DOI: 10.1039/C2CC32500D)
33. B. D. Wall and J. D. Tovar, "Synthesis and characterization of pi-conjugated peptide-based supramolecular materials," invited by ***Pure and Applied Chemistry*** (selected conference papers from the 14th International Symposium on Novel Aromatic Compounds, Eugene, OR, July 2011), 2012 (84) 1039-1045. (DOI:10.1351/PAC-CON-11-10-24)
32. S. R. Diegelmann, N. Hartman, N. Markovic and J. D. Tovar, "Synthesis and alignment of discrete polydiacetylene-peptide nanostructures," in the ***Journal of the American Chemical Society***, 2012 (134) 2028-2031. (DOI: 10.1021/ja211539j)
31. B. D. Wall,* S. R. Diegelmann,* S. Zhang,* T. J. Dawidczyk, W. L. Wilson, H. E. Katz, H.-Q. Mao and J. D. Tovar, "Aligned macroscopic domains of optoelectronic nanostructures prepared via the shear flow assembly of peptide hydrogels," cover article in ***Advanced Materials***, 2011 (23) 5009-5014. (DOI: 10.1002/adma.201102963)
30. C. P. Harvey and J. D. Tovar, "Main chain photochromic conducting polymers," invited by ***Polymer Chemistry***, 2011 (2) 2699-2706. (DOI: 10.1039/C1PY00304F)
29. C. P. Harvey and J. D. Tovar, "Pi-conjugated chain extenders for the synthesis of optoelectronic segmented polyurethanes," in the ***Journal of Polymer Science Part A: Polymer Chemistry***, 2011 (49) 4861-4874. (DOI: 10.1002/pola.24937)
28. J. D. Tovar, "Organic halogenation chemistry as a vital tool for the construction of functional pi-conjugated materials" invited by ***Synthesis*** (special issue on "organic halogenation," Erick M. Carreira, editor), 2011, 2387-2391. (DOI: 10.1055/s-0030-1260086)
27. **G. A. Elbaz,* L. M. Repka*** and J. D. Tovar, "Influence of annulene ratio on the electrochemical and spectroscopic properties of methano[10]annulene-thiophene random copolymers," in ***ACS Applied Materials & Interfaces***, 2011 (3) 2551-2556. (DOI: 10.1021/am200409b)
26. A. Caruso Jr. and J. D. Tovar, "Conjugated "*B*-entacenes:" polycyclic aromatics containing two borepin rings," in ***Organic Letters***, 2011 (13) 3106-3109. (DOI: 10.1021/ol2010159)
25. A. Caruso Jr. and J. D. Tovar, "Functionalized dibenzoborepins as components of small molecule and polymeric pi-conjugated electronic materials," in the ***Journal of Organic Chemistry***, 2011 (76) 2227-2239. (DOI: 10.1021/jo2001726)
24. P. A. Peart and J. D. Tovar, "Poly(cyclopropenone)s: formal inclusion of the smallest Hückel aromatic into pi-conjugated polymers," in the ***Journal of Organic Chemistry***, 2010 (75) 5689-5696. (DOI: 10.1021/jo101108f)
23. A. Caruso Jr., M. A. Siegler and J. D. Tovar, "Synthesis of functionalizable boron-containing pi-electron molecules that incorporate formally aromatic fused borepin rings," in ***Angewandte Chemie International Edition***, 2010 (49) 4213-4217 (DOI: 10.1002/anie.201000411)
22. **G. S. Vadehra**,* B. D. Wall,* S. R. Diegelmann* and J. D. Tovar, "On-resin dimerization incorporates a diverse array of pi-conjugated functionality within aqueous self-assembling peptide backbones," in ***Chemical Communications***, 2010 (46) 3947-3949 (DOI: 10.1039/c0cc00301h)

21. P. A. Peart, **G. Elbaz** and J. D. Tovar, "Optical and electrical properties of pi-conjugated polymers built with the 10 pi-electron methano[10]annulene ring system," invited by ***Pure and Applied Chemistry*** (selected conference papers from the 13th International Symposium on Novel Aromatic Compounds, Luxembourg, July 2009), 2010 (82) 1045-1053. (doi:10.1351/PAC-CON-09-10-05)
20. A. M. Fraind and J. D. Tovar, "Comparative survey of conducting polymers containing benzene, naphthalene and anthracene cores: interplay of localized aromaticity and polymer electronic structures," in the ***Journal of Physical Chemistry B***, 2010 (114) 3104-3116. (doi:10.1021/jp9101459)
19. J. D. Tovar, S. R. Diegelmann,* and P. A. Peart,* "Non-traditional aromatic topologies and biomimetic assembly motifs as components of functional pi-conjugated oligomers," invited by ***Materials*** (special issue on "Conjugated Oligomers," guest editor Herbert Meier), 2010 (3) 1269-1280. (doi:10.3390/ma3021269) (* contributed equally)
18. P. A. Peart and J. D. Tovar, "Expanding the realm of furan-based conducting polymers through conjugation with 1,6-methano[10]annulene," in ***Macromolecules***, 2009 (42) 4449-4455. (doi:10.1021/ma9006494)
17. D. A. Guthrie and J. D. Tovar, "Conformationally complex p-conjugated molecular and polymeric materials: new challenges for organic synthesis," invited by ***Chemistry - A European Journal***, 2009 (15) 5176-5185. (doi:10.1002/chem.200900398)
16. S. R. Diegelmann, J. M. Gorham and J. D. Tovar, "One-dimensional optoelectronic nanostructures derived from the aqueous self-assembly of p-conjugated oligopeptides," in the ***Journal of the American Chemical Society***, 2008 (130) 13840-13841. (doi:10.1021/ja805491d)
15. D. A. Guthrie and J. D. Tovar, "Conformation as a protecting group: a regioselective aromatic bromination en route to complex p-electron systems," in ***Organic Letters***, 2008 (10) 4323-4326. (doi:10.1021/ol801828n)
14. P. A. Peart, **L. M. Repka** and J. D. Tovar, "Emerging prospects for unusual aromaticity in organic electronic materials: the case for methano[10]annulene," invited by the ***European Journal of Organic Chemistry***, 2008, 2193-2206. (doi:10.1002/ejoc.200701102)
    NOTE: correction posted 24 June 2008 (DOI: 10.1002/ejoc.200800533)
13. P. A. Peart and J. D. Tovar, "Methano[10]annulene revisited: extended delocalization through conjugated polymers bearing larger Hückel aromatics," in ***Organic Letters***, 2007 (9) 3041-3044. (doi:10.1021/ol071062y)

Publications from mentored research

12. J. D. Tovar, B. M. Rabatic and S. I. Stupp, "Conducting polymers confined within bioactive peptide amphiphiles," in ***Small***, 2007 (3) 2024-2028. (doi:10.1002/smll.200600645)
11. A. Rose, J. D. Tovar, S. Yamaguchi, E. E. Nesterov, Z. Zhu and T. M. Swager, "Energy migration in conjugated polymers: the role of molecular structure," in the ***Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences***, 2007 (365) 1589-1606. (doi:10.1098/rsta.2007.2033)
10. R. Basu, C. R. Kinser, J. D. Tovar and M. C. Hersam, "Bromine Functionalized Molecular Adlayers on Hydrogen Passivated Silicon Surfaces," in ***Chemical Physics***, 2006 (326) 144-150. (doi:10.1016/j.chemphys.2005.12.023)
9. R. Basu, J. D. Tovar and M. C. Hersam, "Scanning Tunneling Microscopy Study of Single Molecule Motion on the Si(100)-2x1 Surface," in the ***Journal of Vacuum Science and Technology B***, 2005 (23) 1785-1789. (doi:10.1116/1.1949213)

8. J. D. Tovar, R. C. Claussen and S. I. Stupp, "Probing the Interior of Peptide Amphiphile Supramolecular Aggregates," in the ***Journal of the American Chemical Society***, 2005 (127) 7337-7345. (doi:10.1021/ja043764d)
7. J. D. Tovar and T. M. Swager, "Synthesis of Tuneable Electrochromic and Fluorescent Polymers," in the ***ACS Symposium Series***, 2004 (888) 368-376.
6. J. D. Tovar and T. M. Swager, "Cofacially Constrained Organic Semiconductors," in the ***Journal of Polymer Science Part A: Polymer Chemistry***, 2003 (41) 3693-3702. (doi:10.1002/pola.10970)
5. J. D. Tovar, A. Rose and T. M. Swager, "Functionalizable Polycyclic Aromatics Through Oxidative Cyclization of Pendant Thiophenes," in the ***Journal of the American Chemical Society***, 2002 (124) 7762-7769. (doi:10.1021/ja0262636)
4. J. D. Tovar and T. M. Swager, "Exploiting the Versatility of Organometallic Cross-Coupling Reactions for Entry into Extended Aromatic Systems," invited by the ***Journal of Organometallic Chemistry***, 2002 (653) 215-222. (doi:10.1016/S0022-328X(02)01166-X)
3. J. D. Tovar and T. M. Swager, "Poly(naphthodithiophene)s: Robust, Conductive Electrochromics via Tandem Cyclization-Polymerizations," in ***Advanced Materials***, 2001 (13) 1775-1780. (doi:10.1002/1521-4095(200112)13:23<1775::AID-ADMA1775>3.0.CO;2-N)
2. J. D. Tovar and T. M. Swager, "Pyrylium Salts via Electrophilic Cyclization: Applications for Novel 3-Arylisoquinoline Syntheses," in the ***Journal of Organic Chemistry***, 1999 (64) 6499-6504. (doi:10.1021/jo990810x)
1. **J. D. Tovar**, N. Jux, T. Jarrosson, S. I. Khan and Y. Rubin, "Synthesis and X-Ray Characterization of an Octaalkynyldibenzooctadehydro[12]annulene," in ***the Journal of Organic Chemistry***, 1997 (62) 3432-3433. (doi:10.1021/jo970368n)

BOOK CHAPTERS, BOOK REVIEWS AND PROFILES

7. T. S. Kale and J. D. Tovar, "Synthesis and Evaluation of Self—Assembled Nanostructures of Peptide-pi chromophore Conjugates," invited for *"Peptide Self-Assembly: Methods and Protocols" in* ***Methods in Molecular Biology***, 2018 (1777) 209-220; B. L. Nilsson, T. M. Doran, Eds. (doi: 10.1007/978-1-4939-7811-3_12)
6. D. R. Levine and J. D. Tovar, "Boron-containing polycyclic aromatics," invited for ***Polycyclic Arenes and Heteroarenes: Synthesis, Properties, and Applications***; Q. Miao, Ed.; John Wiley & Sons: New York, 2015; 251-276.
5. S. R. Diegelmann, B. D. Wall and J. D. Tovar, "Recent developments towards the synthesis of supramolecular bioelectronic nanostructures," invited for ***Nanopatterning and Nanoscale Devices for Biological Applications****;* S. Selimovic, Ed.; CRC Press: Boca Raton FL, 2015; 93-116.
4. B. C. Streifel and J. D. Tovar, "Pi-conjugated furan-based polymers," invited for the ***Encyclopedia of Polymer Science and Technology****;* John Wiley & Sons: New York, 2012. (doi: 10.1002/0471440264.pst578)
3. J. D. Tovar, "PROFILE: Early Excellence in Physical Organic Chemistry," invited by the ***Journal of Physical Organic Chemistry***, 2012 (25) 271. (doi: 10.1002/poc.2932)
2. J. D. Tovar, Review of "Electrochemistry of Functional Supramolecular Systems" edited by P, Ceroni, A. Credi and M. Venturi (Wiley 2010) in the ***Journal of the American Chemical Society***, 2010 (132) 9511. (DOI: 10.1021/ja104428n)
1. S. R. Diegelmann, B. D. Wall and J. D. Tovar, "Recent developments towards the synthesis of supramolecular bioelectronic nanostructures," invited for ***Nanoelectronics:***

Nanowires, Molecular Electronics, and Nanodevices*;* K. Iniewski, Ed.; McGraw-Hill: New York, 2011; 289-317.

PATENTS

7. J. D. Tovar, R. Jasti, M. Kertesz *et al*., "Polymer embodiments comprising nanohoop-containing polymer backbones and methods of making and using the same," U.S. Provisional patent No. 62/907,145 (filed 9/27/2019)
6. J. D. Tovar, H. E. Katz, H. A. M. Ardoña, A. M. Sanders, K. Besar, "Energy transfer within pi-conjugated peptide heterostructures in aqueous environments," U.S. Patent No. 10,316,060 (issued 6/11/2019).
5. J. D. Tovar and A. M. Sanders, "Palladium catalyzed reactions executed on solid-phase peptide synthesis supports including on-resin dimerization for the production of self-assembling peptides embedded with complex organic electronic subunits," U.S. Patent No. 9,234,003 (issued 1/12/2016).
4. J. D. Tovar, B. C. Streifel and P. A. Peart, "Disordered organic electronic materials based on non-benzenoid 1,6-methano[10]annulene rings," U.S. Patent No. 8,853,349 (issued 10/7/2014).
3. J. D. Tovar and A. M. Sanders, "Palladium catalyzed reactions executed on solid-phase peptide synthesis supports including on-resin dimerization for the production of self-assembling peptides embedded with complex organic electronic subunits," U.S. Patent No. 8,871,903 (issued 10/22/2014).
2. J. D. Tovar and A. Caruso, Jr. "Synthesis of functionalizable boron-containing pi-electron materials incorporating one and two formally aromatic fused borepin rings," PCT Int. Appl. 2011 (WO 2011127383).
1. J. D. Tovar, S. R. Diegelmann, B. D. Wall, and G. S. Vadehra, "Self-assembling peptides bearing organic electronic functionality and applications employing the same," U.S. Patent No. 9,334,304 (issued 5/10/2016).

MISCELLANEOUS

US citizen: Born in Waterloo, Iowa