CURRICULUM VITAE

Michael R. Fisch, Ph.D.

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EDUCATION

Ph.D. Harvard University (1981) Applied Physics, Dissertation on the critical behavior of the smectic elastic constant (liquid crystal physics)
M.S. John Carroll University (1975) Physics
B.S. John Carroll University (1974) Physics

EXPERIENCE

Sept 2019-present Associate Professor Kent State University (KSU)
Sept 2013-Aug 2019 Assistant Professor Kent State University (KSU)
Jan 2009-August 2013 NTT Associate Professor of Technology Kent State University
June 2005-December 2008 Director, Program on Electron Beam Technology KSU
December 2004- June 2005 Interim Director, Program on Electron Beam Technology, Kent State University
2000-2004 Associate Professor, Liquid Crystal Institute KSU
1999 -2000 Visiting Scientist, Liquid Crystal Institute, Kent State University
1995 –99 Professor of Physics John Carroll University
1990-95 Associate Professor of Physics John Carroll University
1985-90 Assistant Professor of Physics John Carroll University
1982-85 Visiting Scientist in Physic, M.I.T.
198l-82 Postdoctoral Research Associate, Physics Department, Massachusetts Institute of Technology (MIT)

MEMBERSHIPS:

American Physical Society
American Chemical Society
Institute of Electrical and Electronics Engineers

RESEARCH INTERESTS:

Liquid crystal properties and their application to devices
Polymer composites and nanocomposites
Sensor and sensor systems for smart systems and materials
Transformative changes in undergraduate education
Energy storage, saving and production materials
Novel wind power technologies

HONORS and AWARDS:

IBM and Xerox pre-doctoral fellowships at Harvard University (1979, 80)

Nominated for outstanding teaching award at John Carroll University, 1996.

Inducted into Beachwood High School Gallery of Success, 2000

Only faculty member at a predominantly undergraduate school in ALCOM (advanced liquid crystal optical materials science and technology center, a NSF funded consortium of Case Akron and Kent State). John Carroll University at the time had only a small master's degree program in Physics (1990-97)

Book: **Liquid crystals, laptops and life** published by World Scientific (2004).

Managed $2 million project on optical phased arrays (2002-2004)(Project director Phil Bos, LCI)

PATENTS:

Three patents in liquid crystal device applications (Cholesteric liquid crystal devices: 5477358, 1995, 5602662, 1997), (Buff-free alignment layer: 6942905, 2005) (various co-inventors)

One patent on device for hunting "Weapon and Tool Head Method "(11, 747, 118 B2, 2023) (Eren, Bebber, Fisch, Kavulic and True).

GRANTS:

Funded Proposals:

NSF. "US-Ireland R&D Partnership: Structure-property relationships of new polar liquid crystalline phases through synthesis and characterization using a range of analytical techniques $511,885. (June 2022)

PRF# 59345-ND7, "Development and Understanding of Mixed Lyotropic Liquid Crystals," Petroleum Research Fund, $110,000 (2018).

NSF: MRI: Acquisition of an ultrasmall-, small- and wide-angle x-ray scattering instrument for multidisciplinary advanced materials and soft matter research and education," co-PI, Hegmann PI, $611,260 (2020)

Ohio Department of Higher Education: MRI: Acquisition of an ultrasmall-, small- and wide-angle x-ray scattering instrument for multidisciplinary advanced materials and soft matter research and education," co-PI, Hegmann PI, $130,984. (2020)

Ohio Department of Higher Education: Choose Ohio First Scholar Program at Kent State University, co-PI, Coolen PI, $5,000,000 (2021)

Ohio Department of Higher Education: Choose Ohio first in Mathematics and Engineering at Kent State, co-PI, Coolen PI, $1,500,000 (2022)

Ohio Development Services Agency: COVID-19 Supplemental Funding for Ohio SBDC at Kent State University CAE, co-PI Southards PI, $255,400 (2020).

Youngstown Business Incubator/Ohio Federal Research Network: Geometrically Complex 3D Printed Antennas for UAVs, Co PI with Stringer, $99,000. (2020).

Ohio Department of Higher education, "Primal points," c-PI, Eren PI, $12,000 (2021).

Kent State University Foundation grant for updating hydraulics lab, $42,000 (2015)

Samsung grant to study liquid crystals and nanoparticles $125,000 with S. Kumar (2013)

2003-2008 ONR grant for $210,000 (2001-2004) (with Rolfe Petschek of CWRU)

Awarded two grants from the Research Corporation ($60,000) (1985, 1993) (Sole PI)

State of Ohio research grant ($50,000) (Sole PI)

Undergraduate laboratory grant from the National Science Foundation (NSF) ($40,000) (Sole PI)

Three individual NSF research grants (approximately $360,000 total) (1989-1997) (Sole PI)

Hayes Program Grant from Ohio ((with Kent State and Akron $2,000,000) (1993)

Pending Proposal:

S-STEM: S-TEST (Scholarships to Transform Engineering Student Trajectories, $2,000,000 Submitted to NSF March 2024.

Unfunded Proposals:

"Thermo-Mechanical and Structural Studies of Main-Chain Liquid Crystal Elastomers" submitted to NSF November 2014.

"Molecular Structure and Order in Liquid Crystal Elastomers and Their Thermo-elastic Behavior" submitted to NSF November 2015.

"Increasing Electric Sustainability through Vertical Wind Turbine Geodomes submitted to Farris Family Fund with Dr. Blake Stringer, Fall 2015.

"Microreplication of Aircraft Drag Reduction Riblet Design with Nanoparticle Compounded Coatings," submitted to OAI, December 2015 with Bluetronix and Blake Stringer. This was awarded $10,000 to complete a full proposal. The full proposal was not funded.

"Global and local orientational and positional orders in exotic nematic and smectic liquid crystals," submitted to NSF Nov 2016.

"A new family of lyotropic liquid crystals," submitted to The Petroleum Research Fund, April, 2016.

"Increasing Electric Sustainability through Vertical Wind Turbine Geodomes submitted to Farris Family Fund with Dr. Blake Stringer, spring 2017.

"Scholarships for engineering and engineering technology students," submitted to NSF March, 2017 and 2019.

"Engineering Excellence Initiative," submitted to NSF March 2020

Engineering Excellence Initiative," submitted to NSF March 2021

"Blueprint for Equitable Engineering Education," submitted to NSF March 2022

S-STEM: Track 3: "S-CHIPS Scholarships for Chips students," submitted to NSF March 2023.

PROFESSIONAL, COMMUNITY, and ACADEMIC SERVICE:

Chair of Ohio section of the American Physical Society meeting at John Carroll. (1986)

Chair of session at April 2015 APS Ohio section meeting at Kent State University

Member of organizing committee for 14th international liquid crystal conference (1995)

NSF review board for equipment grants (1987)

Reviewer for *Liquid Crystals*, *Journal of Physical Chemistry*, and *Langmuir* (about 3 papers per year)

Member of three different Ohio Board of Education committees, (1999-2002)

Member and past chairmen of the Faculty service committee at John Carroll University (1994-1996)
Member of John Carroll University planning committee (1990-1995)
Member of John Carroll University scheduling committee (1993-1995)
Member of student development committee (1990-1992)
Member of head librarian search committee at John Carroll (1993)
Former member and chair of the St. James Parish Pastoral Council (1994-97)
Two Ph. D. Students: Dan Harrison, CWRU Physics (1997), Clinton Braganza, Chemical Physics Program, Kent State University (2009). Neither John Carroll University or The College Applied Engineering, Sustainability and Technology have Ph. D programs.
Current Ph.D. student, Christopher Schmiedl, materials science program.

KENT STATE UNIVERSITY COMMITTEES AND COURSES

Committees at Kent State University

- College of Applied Engineering, Sustainability and Technology student grievance committee (2012-present, chair 2014-present)
- Faculty member of the college advisory committee, 2015-16 academic year-present.
- College of Applied Engineering, Sustainability and Technology library committee representative, 2011-present.
- Currently a member of state of Ohio TAG committee for technology
- Faculty search committee member for aeronautics position, KSU College of Applied Engineering, Sustainability and Technology, 2014 and 2016, 2020
- Faculty search committee chair for NTT position, KSU College of Aeronautics and Engineering, 2017.
- Faculty search committee member for computer engineering position, KSU College of Aeronautics and Engineering, 2017.
- College of Applied Engineering, Sustainability and Technology representative to university requirements curriculum committee, 2011-2015, 2016-present.
- Member of review of student survey of instruction (SSI) committee; 2017-2018.
- Faculty search committee for physics faculty member, KSU Ashtabula campus, 2008
- Faculty search committee for electronics position, KSU College of Technology 2006
- Member of College curriculum committee 2015-2024
- Member of College Advisory Committee 2015-present
- Provost Advisory Committee 2019-2020
- Provost Promotion Committee 2019-2024
- University Teaching Council 2018-present

Recent courses taught and years:

- TECH/ENGR 33111 Statics and Strength of Materials (2012-2024)
- TECH/ENGR 33363-4 Metallurgy and Materials Science (2010-2024)
- TECH 33033 Hydraulics/pneumatics (2009-2014, 2016-2018)
- TECH 33222 Digital Design Applications (2010, 2011, 2015)
- TECH 43800 Applied Engineering Technology Seminar (2011, 2012 and 2014)
- AERN 45350/55350 Avionics (2012-2014)
- TECH 20001 Energy and Power (2011 and 2012, 2017)
- TECH 32002 Materials and processes II (Focus on polymers) (2011)
- TECH 43221/53221 Digital Control System Instrumentation (2011)
- TECH 21021 Survey of Electricity and Electronics (2011)
- TECH 33220 Electronic Devices (2010)
- TECH 20004 Electric Circuits (2009 and 2010)
- ENGR 42111/52111 Strength of Materials for Engineers (2020- present)
- ENGR 42363/52363 Materials Selection (2020-present)

PUBLICATIONS: (Peer reviewed except when followed by **NPR**)

91. "Effect of doping with carbon dots on the alignment and dielectric properties of nematic liquid crystal 4-cyano-4′-pentylbiphenyl in ITO sample cells without conventional alignment layers for low-cost display applications." Priscilla, P., et al. "Effect of doping with carbon dots on the alignment and dielectric properties of nematic liquid crystal 4-cyano-4′-pentylbiphenyl in ITO sample cells without conventional alignment layers for low-cost display applications." *Journal of Molecular Structure* 1321 (2025): 139894. https://doi.org/10.1016/j.molstruc.2024.139894

90. "Unveiling molecular alignment, dielectric and electrical conductivity of an unaligned 4-octyl-4′-cyanobiphenyl liquid crystal doped with carbon dots." Priscilla P , Michael R. Fisch, Sandeep Kumar, Arvind K. Gathania, Jai Prakash, Supreet, Sanjeev Kumar, Riccardo Castagna, Gautam, Colloids and Surfaces A: Physicochemical and Engineering Aspects. 2025 Feb 20;707:135854 https://doi.org/10.1016/j.colsurfa.2024.135854.

89. Carbon dots induced homeotropic alignment in a negative dielectric nematic liquid crystal material." Priscilla, P., Arvind K. Gathania, Sandeep Kumar, Michael R. Fisch, Jai Prakash, Sanjeev Kumar, and Gautam Singh. *Nano Express* 5, no. 4 (2024): 045008. https://doi.org/10.1088/2632-959X/ad8c6f.

88. "Dicationic ionic liquid crystals: Synthesis, characterization, optical properties, and ionic conductivity of bis(4-oligoethyleneoxyphenyl) viologen bistosylate salts." Pradip K. Bhowmik, Si L. Chen, David King, Haesook Hana Zane Bolyard, Christopher Schmiedl, Michael R. Fisch, Sanjeev R. Gopal, Thamil Selvi Velayutham, Alfonso Martinez-Felipe, Journal of Molecular Liquids, 398 (2024) 124140 https://doi.org/10.1016/j.molliq.2024.124140.

87. "Stone tool backing and adhesion in hunting weaponry: First results of an experimental program." J Pargeter, C Chen, B Buchanan, M. Fisch, M. Bebber, M. I. Eren, Journal of Archaeological Science: Reports 45 (2022) 103639. https://doi.org/10.1016/j.jasrep.2022.103639

86. "Bis(4-alkoxyphenyl) Viologen Bis(triflimide) Salts: Synthesis, Thermotropic Liquid-crystalline and Light-emitting Properties." Pradip K. Bhowmik, Mohammed Kareem M. Al-Karawi, Shane T. Killarney, Erenz J. Dizon, Anthony Chang, Jongin Kim, Si L. Chen, Ronald Carlo G. Principe, Andy Ho, Haesook Han, Hari D. Mandal, Raymond G. Cortez, Bryan Gutierrez, Klarissa Mendez, Lewis Sharpnack, Deña M. Agra-Kooijman, Michael R. Fisch and Satyendra Kumar, Chapter 3 in **New Innovations in Chemistry and Biochemistry Vol. 3**, Book Publisher International: London, UK, ISBN: 978-93-5547-039-3 (Print), 978-93-5547-040-9. https://doi.org/10.9734/bpi/ctcb/v2/2536B

85. "Another tool in the experimental toolbox: On the use of aluminum as a substitute for chert in North American prehistoric ballistics research and beyond." Eren, M. I., Mukusha, L., Lierenz, J., Wilson, M., Bebber, M. R., Fisch, M., & Key, A. (2022). "*North American Archaeologist*, 01976931221074386. https://doi.org/10.1177/01976931221074386

84. "Ionic liquid crystals: synthesis and characterization via NMR, DSC, POM, X-ray diffraction and ionic conductivity of asymmetric viologen bistriflimide salts." Pradip K. Bhowmik, Omar Noori, Si L. Chen, Haesook Han, Michael R. Fisch, Christina M. Robb, Alfonso Martinez-Felipe, Journal of Molecular Liquids**, 328**, April 2021, 115370. https://doi.org/10.1016/j.molliq.2021.115370

83. "An initial study comparing bilobate versus trilobate morphologies." D Mullen, T Matney, A Morrison, M Fisch, B Buchanan, MR Bebber. Journal of Archaeological Science: Reports 35 (2021) 102765. https://doi.org/10.1016/j.jasrep.2020.102765

82. "Human behavior or taphonomy? On the breakage of Eastern North American Paleoindian endscrapers." Perrone A, Wilson. M, Fisch M, Buchanan, B, Bebber M, Eren, M. Archaeological and Anthropological Sciences. 12. (2020) https://dio.org/10.1007/s12520-020-01143-w .

81. "Thermal engineering of stone increased prehistoric toolmaking skill," Mraz, V., Fisch, M., Eren, M.I., Lovejoy, C. O., B. Buchanan. *Sci Rep* 9, 14591 (2019). https://doi.org/10.1038/s41598-019-51139-3.

80. "Controlled experiments support the role of function in the evolution of the North American copper tool repertoire," Michelle R. Bebber, James D. Norris, Kat Flood, Michael Fisch, Richard S. Meindl, Metin I. Eren. Journal of Archaeological Science: Reports 26 (2019) 101917. https://doi.org/10.1016/j.jasrep.2019.101917

79. "The exceptional abandonment of metal tools by North American hunter-gatherers, 3000 B.P." Michelle R. Bebber, Alastair J. M. Key, Michael Fisch, Richard S. Meindl and Metin Erin. *Science Reports (2019) 9:5756* | https://doi.org/10.1038/s41598-019-42185-y

78. Chiral and orientationally ordered fluid mesophases formed by oxadiazole bisaniline based achiral bent mesogens," Hari Krishna Bisoyi, Gautam Singh, Michael R. Fisch, Dena M. Agra-Kooijman, Quan Li & Satyendra Kumar. (2019) *Liquid Crystals*, DOI: 10.1080/02678292.2019.1566504

77. "Electrically tunable photoluminescence of semiconducting quantum dots doped nematic liquid crystal nanocomposites," Gautam Singh, Michael R. Fisch, and Satyendra Kumar. AIP Conference Proceedings **1953**, 060042 (2018). https://doi.org/10.1063/1.5032773 **NPR**

76. "Comparing the use of meat and clay during cutting and projectile Research," Alastair Key, Jesse Young, Michael R. Fisch, Morgan E. Chaney, Andrew Kramer, Metin I. Eren. Engineering Fracture Mechanics, **192**, 163-175 (2018). https://doi.org/10.1016/j.engfracmech.2018.02.010

75. "Early Stage blunting causes rapid reduction in stone tool performance," Alastair Key, Michael R. Fisch, Metin I. Eren. Journal of Archaeological Science **91** 1-11 (2018).

https://doi.org/10.1016/j.jas.2018.01.003

74. "A performance-based evaluation of chemically similar (carbonate) tempers from Late Prehistoric (AD 1200-1700) Ohio: Implications for human selection and production of ceramic technology," Michelle Rae Bebber, Linda B. Spurlock, Michael Fisch. PLoS ONE **13**(3): e0194992 (2018). https://doi.org/10.1371/journal.pone.0194992

73. "de Vries liquid crystals based on a chiral 5-phenylpyrimidine benzoate core with a tri- and tetra-carbosilane backbone," S. P. Sreenilayam, D. Rodriguez-Lojo, D. M. Agra-Kooijman, J. K. Vij, V. P. Panov, A. Panov, M. R. Fisch, Satyendra Kumar, and P. J. Stevenson. Phys Rev Materials, **2,** 025603 (2018). DOI: 10.1103/PhysRevMaterials.2.025603

72. "A new 360° airfoil model for predicting airfoil thrust potential in vertical-axis wind turbine designs," D. Blake Stringer, Paul Hartman, Dakota W. Bunner, Michael R. Fisch. J Renewable and Sustainable Energy **10**, 013304 (2018). https://doi.org/10.1063/1.5011207

71. "Thermotropic liquid-crystalline properties of extended viologen bis(triflimide) salts," Pradip K. Bhowmik, Shane T. Killarney, Jessa Rose A. Li, Jung Jae Koh, Haesook Han, Lewis Sharpnack, Deña M. Agra-Kooijman, Michael R. Fisch & Satyendra Kumar. Liquid crystals, **45,** 872-885 (2018). https://doi.org/10.1080/02678292.2017.1397213.

70. "The integrals determining orientational order in liquid crystals by x-ray diffraction revisited," D. M. Agra-Kooijman, M. R. Fisch and S. Kumar. Liquid Crystals, **45,** 680-686 (2018). https://doi.org/10.1080/02678292.2017.1372526

69. "The oblique chiral nematic phase in calamitic mesogens," Deña M. Agra-Kooijman, Gautam Singh, Michael R. Fisch, M. R. Vengatesan, Jang-Kun Song and Satyendra Kumar, Liquid Crystals, **44**, 191-203 (2017). https://doi.org/10.1080/02678292.2016.1272141

68. "Phase behavior and characterization of heptamethyltrisiloxane-based de Vries smectic liquid crystal by electro-optics, x rays, and dielectric spectroscopy," S. P. Sreenilayam,D. M. Agra-Kooijman, V. P. Panov, V. Swaminathan, J. K. Vij, Yu. P. Panarin, A. Kocot, A. Panov, D. Rodriguez-Lojo, P. J. Stevenson, Michael R. Fisch, and Satyendra Kumar, Phys. Rev. E. **95**, 032701 (2017). https://journals.aps.org/pre/abstract/10.1103/PhysRevE.95.032701.

67. "X-ray and Raman scattering study of orientational order in nematic and heliconical nematic liquid crystals," Gautam Singh, Jinxin Fu, Dena M. Agra-Kooijman, Jang-Kun Song, M. R. Vengatesan, Mohan Srinivasarao, Michael R. Fisch, and Satyendra Kumar, Phys. Rev E **94**, 060701(R) (2016). https://doi.org/10.1103/PhysRevE.94.060701.

66. "Tunable polarised fluorescence of quantum dot doped nematic liquid crystals," Gautam Singh, Michael R. Fisch and Satyendra Kumar, Liquid Crystals, **44,** 444-452 **(**2016). http://dx.doi.org/10.1080/02678292.2016.1217357.

65. "Thermotropic liquid–crystalline properties of 4,4′-dialkoxy-3,3′-diaminobiphenyl compounds and their precursors," Pradip K. Bhowmik, Shane T. Killarney, Jung Jae Koh, Ontida

Tanthmanatham, Haesook Han, Tyler Harris, Michael R. Fisch, Deña M. Agra-Kooijman, Lewis Sharpnack & Satyendra Kumar, Liquid Crystals, **43**, 1560-1577 (2016). http://dx.doi.org/10.1080/02678292.2016.1187770.

64. "Emissivity and electrooptical properties of semiconducting quantum dots/rods and liquid crystal composites: a review," Gautam Singh, Michael Fisch, Satyendra Kumar, Reports on Progress in Physics, **79**, 1-20 (2016). doi:10.1088/0034-4885/79/5/056502 http://iopscience.iop.org/article/10.1088/0034-4885/79/5/056502/pdf

63. "A low cost, reusable, sustainable, batch water purification system," D. W. Enders, A. L. Zuckerman and M. R. Fisch, Water Practice & Technology, **10** No 2, 291(2015).

https://doi.org/10.2166/wpt.2015.034 .

62. "Room temperature heliconical twist-bend nematic liquid crystal," Yuan Wang, Gautam Singh, Dena M. Agra-Kooijman, Min Gao, Hari Krishna Bisoyi, Chenming Xue, Michael R. Fisch, Satyendra Kumar and Quan Li, CrystEngComm17, 2778, (2015). https://doi.org/10.1039/C4CE02502D

61 "Dual relaxation and structural changes under uniaxial strain in main-chain smectic-C liquid crystal elastomer," Dena M. Agra-Kooijman, Michael R. Fisch, Leela Joshi, Wanting Ren, Philip J. McMullan, Anselm C. Griffin and Satyendra Kumar, Phys.Chem.Chem.Phys., **17**, 191 (2015). https://doi.org/10.1039/C4CP04713C

60. "Dielectric properties of ternary composites of triblock polymer surfactant, liquid crystal and organic solvent," M. R. Fisch, Clinton Braganza, L. C. Chien and R. G. Petschek, Journal of Advanced Dielectrics, **4**, 3, paper 145022 (2014). https://doi.org/10.1142/S2010135X14500222 .

59. "Effects of electron beam irradiation of cellulose acetate cigarette filters," M. Czayka and M. Fisch. Radiation Physics and Chemistry, Volume 81, Issue 7, p. 874-878 (2012).

58. "Spectrographic ellipsometry study of a liquid crystal display substrate consisting of thin films of SiO2, polyimide and indium tin oxide on glass," Clinton Braganza, LC Chien, M. R. Fisch, R. G. Petschek. Thin Solid Films 519, 4384–4389 (2012).

57. "Electron beam irradiations of polypropylene syringe barrels and the resulting physical and chemical property changes," Abraham, A.C.; Czayka MA; Fisch, M.R., Radiation Physics and Chemistry, **79,** 83-92, (2010).

56. "Radiation field mapping using a mechanical-electronic detector," Czayka, M., and Fisch, M, Radiation Physics and Chemistry, **79**, pp. 527-533 (2010).

55. "Nanophotonics for quantum optics using nitrogen-vacancy centers in diamond," Santori, C, Barclay, PE, Fu, K-M c, Beausoleil, RG, Spillane, S, Fisch, M, Nanotechnology, **21**, 274008 (2010).

54. "Establishing an ISO 17025 Compliant Laboratory at a University," Karen Hullihen, Verna Fitzsimmons, and Michael R. Fisch, International Journal of Modern Engineering, .**10**, 55-64 (2009).

53. "Establishing an ISO 17025 Compliant Laboratory at a University," Karen Hullihen, Verna Fitzsimmons, and Michael R. Fisch, Proceedings of The 2008 IAJC-I JME International Conference, SBN 978-1-60643-379-9, Paper # 059, IT 305 (2008).

52. "Radiation thickening of iso-polyester resin," Czayka, M.; Fisch, M.; Uribe, Roberto M.; Vargas-Aburto, C., Radiation Physics and Chemistry, **76** June, pp. 1058-1068 (2007).

51. "The effect of terminal chain modifications on the mesomorphic properties of 4,4'-disubstituted diphenyldiacetylenes," Neubert ME, Fisch MR, Keast SS, Kim JM, Lohman MC, Murray RS, Miller KJ, Shenoy RA, Smith MJ, Stayshich RM, Walsh ME, Petschek RG, Lorenzo GA, Burrows DC, Oliver SM, Liquid Crystals, **31** 941 (2004).

50. "New Insights into the nematic to smectic-A transition: x-ray measurements in a strong magnetic field," Andrew Primak, M. Fisch, and Satyendra Kumar Liquid Crystals Today, **12**, 10-15 (2003).

49. "Temporal measurements of surfactant squeeze-out from a surface using a magnetically-levitated bridges," N. M. Patel, P. L. Taylor, M. R. Fisch, C. S. Rosenblatt, Colloids and Surfaces A, **218**, 65-72 (2003).

48. "X-ray diffraction study of Anodisc filters," Michael R. Fisch, Andrew Primak, and Satyendra Kumar, Phys. Rev. E., **65** 046615-1, 7 (2002).

47. "Effect of mosaicity in x-ray studies of critical behavior at the nematic to smectic-A transition," Andrew Primak, M. Fisch, and Satyendra Kumar Phys. Rev. E **66,** 051707 (2002).

46. "The electro-optic properties of colloidal filled nematics," N. J. Diorio, M. R. Fisch, And J. L. West, Liquid Crystals, **29**, 589-596 (2002).

45. "A Non-Rub Technique to Produce Surfaces that Induce Alignment in Liquid Crystals," Daniel Harrison, Michael R. Fisch, Rolfe Petschek, J-F Li, Frank Harris and Heather Korns, Japanese Journal of Applied Physics, **41**, 2183-86 (2002).

44. Critical behavior at the nematic-to-smectic A phase transition in a strong magnetic field," Andrew Primak, Michael R. Fisch, and Satyendra Kumar, Phys. Rev. Lett., **88**, 035701 (2002).

43. Filled liquid crystal depolarizers," N. J. Diorio, M. R. Fisch, And J. L. West, Journal of Applied Physics, **90**, 3675-78 (2001).

42. New techniques for fabrication of flexible plastic LCD's," John L. West, Greg R. Novotny, Michael R. Fisch, and David Heineman, IMD '01 Digest, p. 3-6 (2001).

41. "Introduction to Liquid Crystals", in Liquid Crystal Experimental Study of Physical properties and Phase Transitions, Ed. S. Kumar, Cambridge University Press (2001), Pg 1-28.

40. "The effects of temperature, pressure and concentration on the diffusivity of SDS micelles," C. J. Richards, T. M. Kole, J. S. Collura, D. Harrison, and M. R. Fisch, J. Phys. Chem. B, **105**, 4846-4852, (2001).

39. "Robust Liquid Crystal Droplets," D. Harrison and M. R. Fisch, Liquid Crystals, **27**, 737, (2000).

38. " Turbidity," chapter 62 in The Measurement, Instrumentation and Sensor Handbook, Ed. John Webster, CRC Press, January, (1999).

37. "The Transition from Diffusing to Dynamic Light Scattering in Solutions of Monodisperse Polystyrene Spheres," M. Clapper, J. S. Collura, D. Harrison, M. R. Fisch, Phys. Rev. E**, 59**, 3631, (1999).

36. “Highly Anisotropic elasticity of a dendrimeric Liquid Crystal,” A. J. Jin, M. R. Fisch, M. P. Mahajan, K. A. Crandall, P. Chu, C.-Y. Huang, V. Percec, R. G. Petschek, and C. Rosenblatt, Eur. Phys. J. B 5, 251, (1998).

35. “Solution Behavior of the Zwitterionic Surfactant Octadecyldimethylbetaine,” Daniel Harrison, Rita Szule, and M. R. Fisch, J. Phys. Chem., **102**, 6487, (1998.)

34. “Effects of Pentanol Isomers on the Growth of SDS Micelles in 0.5 M NaCl,” K. L. Thimmons, L. G. Brazdil, D. Harrison, and M. R. Fisch, J. Phys. Chem., **101**, 11087, (1997).

33. “Evaporation Kinetics of Polystyrene Bead Suspensions," James Conway, Heather Korns, and Michael R. Fisch, Langmuir, **13**, 426, (1997).

32. “Experimental Study of noise on photon Autocorrelation Functions," Daniel Harrison, and Michael R. Fisch, Langmuir, **12**, 6691, (1996).

31. “Aggregation Numbers of Micelles in Semidilute Solutions,” J. M. Biltz, and M. R. Fisch, Langmuir, **11,** 3595 (1995).

30. “High Pressure Quasielastic and Static Light Scattering Apparatus,” C. J. Richards and M. R. Fisch, Rev. Sci. Inst., **65**, 335 (1994).

29. “Observation of Quasi Two-Dimensional Nematic Order in a System of Rigid Rods,” Michael R. Fisch and Charles Rosenblatt, Jour. de Phys. II, France **4**, 103, (1994).

28. “Homeotropic, Rub-free Liquid Crystal Light Shutter,” K.A. Crandall, M.R. Fisch, R.G. Petschek, and C.S. Rosenblatt, Applied Phys. Lett., **65**, 118 (1994).

27. "Vanishing Fredericksz Transition Threshold Voltage in a Chiral Nematic Liquid Crystal", K.A. Crandall, M.R. Fisch, R.G. Petschek, and C.S. Rosenblatt, Applied Phys. Lett., 6**4**, 1741 (1994).

26. “Optical Studies of Supramolecular Tubular Structures generated by Taper-Shaped side Groups in the Columnar Hexagonal Phase,” J-F Li, J. A. Heck, V. Percec, C. Rosenblatt, J. S. Collura, and M. R. Fisch, Jour. de Phys. II, France,**4**, 1813 (1994).

25. “A Light Scattering Study of the Effects of 1-pentanol on solutions of Sodium dodecyl Sulfate in NaCl-H2O Solutions,” Shanna M. Stephany, Thomas M. Kole, and Michael R. Fisch, J. Phys. Chem., **98**, 11126 (1994).

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3. "Acoustic Backscattering from Thin air Filled Spherical Shells in Water," J.L. Hunter, M.R. Layton and M.R. Fisch, J. Acoust. Soc. Am., **62**, 1139 (1977).

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[1]**NPR** means non-refereed publication.

Recent talks and posters:

1. "Signature of the de Vries Smectic Phase and their role in the future of liquid crystal displays." L. Sharpnack, D. Rodriguez-Lojo, Gautam Singh, Deña Agra-Kooijman, M. R. Fisch, A. D. Panov, P. J. Stevenson and Satyendra Kumar. Poster at the 2017 Liquid Crystal Gordon Conference.
2. "Electron density distribution of symmetric liquid crystal dimer linked by flexible alkyl chain," Dena Mae Agra-Kooijman, Michael Fisch, Gautam Singh, Muthukumaraswamy Vengatesan, Jangkun Song, Satyendra Kumar at March 2017 APS March Meeting.
3. "*The oblique chiral nematic phase in calamitic and bent-core mesogens*" at Twist-Bend Nematics and Beyond at the University of Southampton (April 7-8, 2016)
4. Coauthor of invited talk at the International Liquid Crystal Elastomer Conference 2015 and Workshop on Active Liquid Crystals and Gels, Erice, Italy, October 2-7, (2015). The paper was entitled *Relaxation and microscopic structural changes in main chain smectic liquid crystal elastomers*.
5. "Untwisting the twist-bend nematic phase of achiral cyanobiphenyl dimer CB7CB," poster at 2015 Gordon conference, June 21-26, 2015.
6. "*A twist in the nematic phase of mixtures of achiral cyanobiphenyl dimer mesogens*," poster at 2015 Spring APS Ohio-region section meeting March 27-28, 2015.
7. "*Stress and Structural relaxations in smectic liquid crystal elastomers*," poster at 2015 Spring APS Ohio-region section meeting March 27-28, 2015.
8. *"Orientational order and cone angle of twist-bend nematic phase in the mixtures of achiral cyanobiphenyl bimesogens"*, G. Singh, D. M. Agra-Kooijman, M. R. Fisch, M. R. Vengatesan, J. -K. Song, and S. Kumar, 23rd National Conference on Liquid Crystals, Indian Institute of Technology (Indian School of Mines) Dhanbad, Jharkhand, India, 7-9 December (2016) [Oral Presentation].
9. *"X-ray diffraction studies of asymmetric viologen bistriflimide salts***,"** Christina Robb and Michael Fisch 27th National Conference on Liquid Crystals, India. December 2020. (Invited talk).
10. "*Conductivity and light response of new ionic liquid crystals and salts*," Bendaoud, Umama; Bhowmik, Pradip K.; Noori, Omar; Chen, Si L.; Han, Haesook; Fisch, Michael R.; Robb, Christina M.; Vergara, Javier; Ros, M. Blanca; Martinez-Felipe, Alfonso, Annual Conference of the British Liquid Crystal Society (2022)
11. **"***Variable Temperature X-Ray Diffraction Study of Dicationic Viologen-Based Liquid Crystals,"* [Christopher Schmiedl, Michael R. Fisch, David King, Haesook Han, Pradip K. Bhowmik] (Materials Science day 2023 and Gordon Research conference 2023).
12. "*X-Ray Studies of Ionic Liquid Crystaline Materials,"* [Souleymane Dansoko, Christopher Schmiedl, Michael R. Fisch, Pradip K. Bhowmik]. Sure poster 2024
13. *"Dicationic ionic liquid crystals: Synthesis, characterization, and optical properties of bis(4-oligoethyleneoxypheyl) viologen bis(4-n-alkylbenzenesulfonate) salts***, "**Pradip K. Bhowmik, Si L. Chen, David King, and Haesook Han, Souleymane Dansoko, Christopher Schmiedl, and Michael R. Fisch ACS Fall Meeting 2024.