

## Andrew J. Christlieb

Department of Computational Mathematics, Science and Engineering  
Michigan State University

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### RESEARCH INTERESTS

Method of Lines Transpose, Fast Convolution Algorithms, Sublimer Algorithms,  
Numerical Analysis, Scientific Computing, Scaleable Algorithms, Novel Computing Platforms

### EDUCATION

- 1998-2001: **Ph.D. Mathematics**, University of Wisconsin – Madison  
Part of the program on Mathematics and Computers in Engineering  
Thesis Title: “Computational Methods for Long Mean Free Path Problems”  
Thesis Advisor: Professor W. Nicholas G. Hitchon
- 1996-1998: **MS Applied Mathematics** - University of Wisconsin – Madison
- 1991-1996: **BS Electrical and Computer Engineering,**  
**BS Mathematics**  
**BS Engineering Math**  
all from University of Michigan – Dearborn

### EMPLOYMENT

Michigan State University

- 7/15–present: Inaugural Chair,  
Department of Computational Mathematics, Science and Engineering
- 7/14–present: University Foundation Professor of Mathematics  
Departments of Mathematics and Electrical and Computer Engineering
- 7/13–7/14: Associate Professor  
Department of Electrical and Computer Engineering
- 7/10–7/14: Associate Professor  
Department of Mathematics
- 9/06–7/10: Assistant Professor  
Department of Mathematics

University of Michigan, Ann Arbor

- 9/02–6/06: Assistant Professor (non-tenure track)  
Department of Mathematics
- 7/01–9/02: Research Fellow Rarefied Gas Dynamics(Supervisor: Professor Iain D. Boyd)  
Department of Aerospace Engineering

### LEADERSHIP STYLE

I strive to be a servant leader who believes in transparency. I am a strong believer in this model. It can be best described in the following way: The primary job of leaders is to fashion and communicate a vision that is substantially informed by input from those they lead, an understanding of what it takes for them to do their jobs, and a willingness to let decisions be made at the lowest possible level. In a complex multifaceted organization, micromanagement is ineffective, one needs

to empower the people working for them to be effective decision makers. Further, transparency in decision making is essential and leads to a well informed organization that understands why decisions are made and helps foster a community engagement.

## **MAJOR LEADERSHIP ACCOMPLISHMENT**

I have led the creation of the new Department of Computational Mathematics, Science and Engineering at MSU. This included setting up a Minor, a PhD program, and hiring 21 faculty external to MSU over three years as well as moving 7 faculty at MSU into CMSE. We are hiring our next 7 faculty. The department focuses on the science of algorithms for problems in science and engineering. Half of the faculty work in the area of data science and the other half work in the area of computational modeling. In addition, every faculty member is joint with one of 9 traditional departments (Bio-Chemistry, Chemical Engineering and Materials Science, Electrical Engineering, Earth and Environmental Sciences, Horticulture, Mathematics, Mechanical Engineering, Physics, Statistics). The department focuses on building an interdisciplinary collaborative environment with a focus on three key MSU areas, computational biology, accelerator physics and technology and energy materials. We have developed an active mentoring program that has resulted in range of career and foundation awards including: one Sloan fellow, two DoE Young Investigator, one DARPA Young Investigator, one AFOSR Young Investigator, parts of two DoE SciDAC's being in CMSE, a range of NSF, AFOSR, NRL, ONR and DoE grants.

## **LEADERSHIP OPPORTUNITIES**

Michigan State University

- 2017 [Sought out additional training in leadership by applying to both 2017 Big 10 Department Executive Officer program and the 2017-2018 Big 10 Academic Leadership Program. Accepted as Fellow in both programs.](#)
- 2017 Served on the College of Natural Science Dean search committee representing Chairs in CNS.
- 2017 [Elected to serve on the IEEE Plasma Science and Applications Committee \(PSAC\). Committee charged with planning and upkeep of key conferences on plasma science and engineering.](#)
- 2017 Leveraged three remaining joint hires into 7 additional hires by working with other chairs, two in data science, two hires in bio-medical imaging and one in deep learning, one joint with Astrophysics and big data and one in uncertainty quantification. Setup hiring committees.
- 2017 Instituted departmental tea and brown bag to help cross discipline cultural divides.
- 2017 Involved CMSE with AMESITE (company) to collaborate on developing an Artificial Intelligent TA. Initial target CMSE 201 (our first course on modeling).
- 2017 [Setup an Ad-Hoc Long term planning committee. Committee charge: identify strengths and weaknesses of CMSE \(grad program, research, diversity, proposed undergrad program, proposed terminal masters, computing needs, departmental organization\), develop priorities, develop action plans and present to AdCom.](#)
- 2017 Setup Ad-Hoc committee to look at developing a professional Masters in CMSE. Initiated a market study.
- 2017 Initiated collaboration between Computer Science, Statics and CMSE on developments on a BS in Data Science.

- 2017 With Chair of Computer Science and Chair of Statistics, setup a three department Ad-Hoc committee to identify best practices in undergraduate degrees in data science.
- 2017 Department continued success with grants. Large AFOSR grants, faculty part of DARPA team Grants, MSU PIs on two SciDAC grants, etc.
- 2017 [Initiated review of mentoring program, as what worked well in 2015 with 8 assistant professor did not scale to 20 assistant professors.](#) Devolving plan to address.
- 2017 Initiated department discussion and charged the graduate committee with looking at in revamping graduate program to better meet the needs of our graduate students identified by EAB and an external visitor from Georgia Tech School of Computing. Changes in progress.
- 2017 Led team to respond to additional 2016 EAB recommendations and developed material for EAB visit (mission statement, long term planning, organization of department around themes).
- 2017 Made the case for resources to hire one additional staff members, = Chairs secretary.
- 2016 Charged committee to setup and run third workshop on Frontiers in Computing and Data Science in CMSE.
- 2016 [Established External Advisory Board \(EAB\) for CMSE](#), consisting of academic, industry and national lab leadership, with yearly visits
- 2016 Led the development of materials for external advisory board.
- 2016 Formed a committee to respond to EAB reconditions.
- 2016 Formed a committee to develop departmental Bylaws, using best practices.
- 2016 Focused hiring plan based on EAB recommendations.
- 2016 Developed partnerships with chairs of Mathematics (two), Earth System Sciences (two), and Electrical Engineering (one), Horticulture (one) and CHEMS (one) departments for next 6 joint hires. Because of strength of pool, leveraged into 8 hires.
- 2016 Led AdCom in development of CMSE template for Memorandum Of Understanding (MOU) for joint appointments.
- 2016 Set procedures for joint appointments with existing faculty on campus.
- 2016 Made the case for resources to hire two additional staff members, graduate secretary and HR coordinator.
- 2016 EAB identified that graduate students were struggling, either they had the mathematics background we expect of the computational and programming skills we expect. Setup an Ad-Hoc committee to design a CMSE boot camp for incoming students to help provide students with background. Charged committee with implementing it.
- 2016 Setup and organized committee to run second workshop on Frontiers in Computing and Data Science in CMSE .
- 2015 [Setup and committee and worked to developed performance evaluation criterion for CMSE faculty, joint appointments with 9 different departments.](#)
- 2015 Inaugural Chair Computational Mathematics, Science and Engineering.
- 2015 Charade Ad-Hoc committee with the development of the CMSE PhD program including dual PhD.
- 2015 Shepherded the PhD program through university committees
- 2015 Charade Ad-Hoc committee with the development of the CMSE undergraduate minor and graduate certificates.
- 2015 Shepherded the undergraduate minor and graduate certificates through university

- committees
- 2015 Led the hiring of key CMSE staff for from the core of the administrative arm of CMSE, unit admin, unit finance and lead teaching specialist.
  - 2015 With CMSE co-Chair, developed faculty mentoring program in CMSE. Mentors were given tasks, review grant proposals, guidance on mentoring of post docs and students, discussing expectations within and outside CMSE, discuss department culture. They meet with new faculty once a month for the first year and then once a term there after.
  - 2015 Developed partnerships with chairs of Bio-Chemistry (two), Physics (two), and CHEMS (one) departments for next 5 joint hires. All majority CMSE faculty.
  - 2015 Organized and hosted first Frontiers in Computing and Data Science CMSE workshop.
  - 2014 Led effort at MSU for engagement during the process of vetting the proposal through faculty governess.
  - 2014 Led the hiring effort for the first 8 new faculty who were appointed in CMSE. Chaired 4 of the search committees and served on the other 4. Three joint with Math and one joint with Statistics all in Data Science. One joint with Physics, One Joint with Bio-Chemistry and two joint with Mechanical Engineering
  - 2014 Identified 5 senior faculty who would transition into the new department if created.
  - 2014 Led team to identify key hiring directions for CMSE and made successful proposal for next 11 faculty.  
Key idea, all faculty are joint with a secondary department, facilitating connections to traditional disciplines why growing CMSE.
  - 2013 Named co-chair of inter-college committee on the possible formation of a new department of computational science. Led 17 faculty from Bio-Chemistry, Chemistry, Computer Science and Engineering, Electrical and Computer Engineering, Mathematics, Mechanical Engineering, Microbiology and Molecular Genetics, Physics, and Statistics to produce a proposal for the new department of Computational Mathematics, Science and Engineering, with the focus on building up computational in three key MSU strengths of Biology, Energy Materials and Accelerator. Half the department focuses on Data Science and half the department on scientific computing.  
<https://acadgov.msu.edu/sites/default/files/content/CSMEDeans%27%20cover%20letterandProposal.pdf>

## HONORS AND AWARDS

### Michigan State University

- 2017 Named a fellow of the 2017-2018 Big 10 Academic Leadership Program (ALP).
- 2017 Named a fellow to the 2017 Big 10 Department Executive Officers (DEO) training program.
- 2015 Named the **Inaugural Chair** of the newly formed Department of Computational Mathematics, Science and Engineering at Michigan State University
- 2014 Named a **University Foundation Professor of Mathematics** at Michigan State University
- 2008 ONR and AFOSR young investigator lecture series. – Invited to give one of the young investigator lectures - October 21<sup>st</sup> 2008.
- 2008 IPAM extended visit fellowship – Awarded an extended visit fellowship for the 2009 workshop on Quantum and Kinetic Transport

- 2007 Air Force Office of Scientific Research – **Scientific Advisory Broad Review**  
One of Ten scientists asked to present a poster on there AFOSR funded research  
to the committee performing an external review of AFOSR (Aug. 1<sup>st</sup> 2007).
- 2007 Air Force Office of Scientific Research – **Young Investigator Award**
- 2006 Air Force Summer Faculty Fellow – **Edwards Air Force Base**

## POSTDOCTORAL STUDENTS-MSU

- **Advisor: Dr. Pierson Guthrey**, (Fall 2017-Present). Topic: *DG and Method of Lines Transpose for Non-Linear Balance Laws of Correlated Plasma*
- **Advisor: Dr. Yan Jiang**, (Fall 2015-Present). Topic: *WENO Constrained Transport for Magnetohydrodynamics on Mapped Grids*
- **Advisor: Dr. Bankim Mandal**, (Fall 2016-2017). Topic: *Domain decomposition for implicit solutions to the Vlasov Position system of equations*  
**Now assistant professor in** Department of Mathematics–Indian Institute of Technology
- **Advisor: Dr. Aditya Viswanathan**, (Fall 2015-2017). Topic:  *$O(N)$  Implicit Solution to Maxwell's Equations Via the Method of Lines Transpose*  
**Now assistant professor in** Department of Mathematics–University of Michigan–Dearborn
- **Advisor: Dr. Wei Gou**, (Fall 2014-2017). Topic: *Method of Lines Traspose and Asymptotic Preserving Maxwell Solvers*  
**Now assistant professor in the** Department of Mathematics–Texas Tech
- **Advisor: Dr. Yuan Liu**, (Fall 2012-2015). Topic: *Positivity Preserving Finite Difference WENO*  
**Now assistant professor in the** Department of Mathematics–Mississippi State University
- **Advisor: Dr. David Seal**, (Fall 2012-2015). Topic: *Picard Integral Formulation of WENO with Time Averaged Fluxes*  
**Now assistant professor in the** Department of Mathematics–US Naval Academy–Annapolis
- **Advisor: Dr. Yaman Guclu**, (Fall 2011-2014). Topic: *Global Models for Plasma Assisted Combustion*  
**Now research scientist at** Max–Planck–Institut for Plasma Physics, Garching bei Munchen, Germany
- **Advisor: Dr. Matt Causely**, (Fall 2011-2014). Topic: *Implicit Maxwell Solvers*  
**Now assistant professor in the** Department of Mathematics–Ketereing University
- **Advisor: Dr. Zhengfu Xu**, (Fall 2010-2011). Topic: *High Order Phase Field Models*  
**Now associate professor in the** Department of Mathematics–Michigan Technological University
- **Advisor: Dr. Benjamin Ong**, (Fall 2007-2011). Topic: *Fast Summation Algorithms for Moving Point Sources*  
**Now assistant professor in the** Department of Mathematics–Michigan Technological University

- **Advisor: Dr. Jing-Mei Qiu**, (Fall 2007-Fall 2008). Topic: *Analysis and Development of High Order Time Stepping Methods*  
**Now associate professor in the** Department of Mathematics–University of Delaware–Air Force Young Investigate (2012)

## GRADUATE STUDENTS-MSU

- **Advisor: Matthew Link**, PhD student in CMSE Fall 2017-Present). Thesis Topic: *Successive convolution for Transport Models*.
- **Advisor: William Sands**, PhD student in CMSE Fall 2017-Present). Thesis Topic: *Successive convolution for Non-linear Balance Laws in Correlated Plasma's*.
- **Advisor: Lucas Stanek**, PhD student in CMSE Spring 2017-Present). Thesis Topic: *Implicit Particle Methods*.
- **Advisor: Firat Cakir**, PhD student in Mathematics Spring 2016-Present). Thesis Topic: *Solving high order phase field models through successive convolution*.
- **Advisor: Mathialakan Thavappiragasam**, PhD student in Electrical Engineering (Fall 2016-Present). Thesis Topic: *An  $O(N)$  implicit method for Maxwell's Equations*
- **Co-Advisor: Gautham Dharuman**, PhD Student in Electrical Engineering (Fall 2013-Present). Thesis Topic: *Momentum Dependent Potentials for Ultra Cold Plasma Situations*
- **Advisor: Michael Crockatt**, PhD Student in Mathematics (Fall 2013-Expected Aug 2018). Thesis Topic: *Parallel Defect Correction for Implicit Kinetic Simulations*
- **Advisor: Bosu Choi**, PhD Student in Mathematics (Spring 2012-Expected Aug 2018). Thesis Topic: *Deterministic sparse approximation algorithms for multi dimensional problems*  
**Will be at University of Texas** (Post Doc)
- **Co-Advisor: Ruochuan Zhang**, PhD Student in Mathematics (Fall 2013-2017). Thesis Topic: *Deterministic sub-linear Fast Fourier Transforms for on fixed grids* **Now at Aptiv** (Algorithm Engineer)
- **Advisor: Xiao Feng**, PhD Student in Mathematics (Fall 2013-2017). Thesis Topic: *Single step methods for Magnetohydrodynamics with constrained transport* **Now at Mathworks** (Research Scientists)
- **US Advisor: Hyoseon Yang**, Visiting PhD student in Mathematics from Ewha W. University in Korea (Fall 2015-August 2016) (PhD 2017). Topic *A combined exponential WENO moving mesh methods for studying singularity formulation* **Now at Ewha** (Post Doc)
- **Advisor: Hana Cho**, PhD Student in Mathematics (Spring 2012- August 2016). Thesis Topic: *Space Time Methods based on fast kernel methods* **Now at LG in Korea** (Research Scientists)
- **Co-Advisor: Rahnema Chowdhury**, MS Student in Electrical Engineering (Fall 2014-August 2016). Thesis Topic: *Fractional Calculus Models in Plasma Science*

- **Co-Advisor: Mayur Jain**, MS Student in Electrical Engineering (Fall 2012- Fall 2015). Thesis Topic: *Treecode Methods for Ultracode Plasma Simulations* **Now at Nexteer Automotive** (Embedded Software Validation Engineer)
- **Advisor: Eric Wolf**, PhD Student in Mathematics (Spring 2011-August 2015). Thesis Topic: *Adaptive meshing methods for electromagnetic plasmas* **Now at Air Force Research Lab - Dayton** (Post Doc)
- **Advisor: Qi Tang**, PhD Student in Mathematics (Spring 2010-August 2015). Thesis Topic: *High order consternated transport for Magnetohydrodynamics* **Now at Rensselaer Polytechnic Institute** (Post Doc)
- **Advisor: Scott Harold High**, MS Student in Mathematics (Fall 2013-Fall 2014). Thesis Topic: *Space Time Multi-Level Domain Decomposition Methods*
- **Advisor: Jaylan Jones**, PhD Mathematics (Fall 2008-August 2012). Thesis Topic: *Simulation of multi-phase casting for functionalized polymers* **Now at Raytheon** (Research Scientists)
- **Advisor: Lee Van Groningen**, PhD Mathematics (Fall 2007-August 2012). Thesis Topic: *Method of Lines Transpose, an implicit Integral Solution Approach to the Wave Equation* **Now at Anderson University** (Assistant Professor)
- **Advisor: David Lawlor**, PhD Mathematics (Fall 2007-August 2012). Thesis Topic: *Deterministic sub-linear Fast Fourier Trasformes for Sparse Singles, a klogk Methods* **Now at HERE Chicago** (Senior Research Engineer)
- **Advisor: Maureen Morton**, PhD Mathematics (Fall 2007-August 2010). Thesis Topic: *High Order Split Schemes and Spectral Differed Correction*

#### GRADUATE STUDENTS-UM

- **Co-Advisor** with Professor Iain D. Boyd: **Jerry Emhoff**, PhD Aerospace Engineering (spring 2005). Thesis Title: *Simulation of Ion Optics Using Particle-In-Cell and Treecode Methods* – **Now at John Hopkins Applied Physics Lab** (Research Scientists)
- **Co-Advisor** with Professor Iain D. Boyd: **Anton VanderWyst**, PhD Aerospace Engineering (fall 2006). Thesis Topic: Modeling the probability distribution function of droplet size for a field emission electric propulsion system – **Now at Raytheon** (Research Scientists)
- **Co-Advisor** with Professor Georg Raithel: **Spencer Olson**, PhD Physics (spring 2006). Thesis Topic: Numerical and experimental studies of novel techniques for the generation of a continuous Bose-Einstein condensate – **Now at AFRL-Kirtland** (Research Scientists)

#### UNDERGRADUATE STUDENTS-MSU

- Supervisor: Summer REU 2012, **Phil Ammirato, Katie Eichinger, Alex Hegedus, Catherine Ross and Rita Vanderstad**, Project: *Embedded Boundary Methods For Maxwells Equ.*

- Co-Supervisor: **Stephen C. Marin**, Math/Engineering, Summer 2005 REU Student. Project Title: *Dynamics of Interacting Point Charges and Vortices within a Constant Magnetic Field*
- Supervisor: **Andrew Melfi**, Math/Physics, Undergraduate Researcher 2010. Project Title: *GPGPU Computing*
- Supervisor: **Kelly King**, Math/Physics, Professorial Assistant 2009. Project Title: *Numerical Integrators*
- Supervisor: **Benjamin Loseth**, Math/Physics, Professorial Assistant 2007. Project Title: *Numerical Methods and Dynamics Systems*

#### UNDERGRADUATE STUDENTS-UM

- Co-Supervisor: **Stephen C. Marin**, Math/Engineering, Summer 2005 REU Student. Project Title: *Dynamics of Interacting Point Charges and Vortices within a Constant Magnetic Field*
- Co-Supervisor: **Benjamin E. Sondag**, Math/Physics, July 2005-June 2006 Undergraduate research supported by AFOSR grant. Project Title: *Point Insertion Methods for Lagrange Simulations of Vlasov Equation*

#### ACTIVE GRANTS

- (2017-2022) Department of Energy SciDAC – Advanced Scientific Computing Research, *Towards Exascale Astrophysics of Mergers and Supernovae (TEAMS)* , Co-PI: A.J. Christlieb, (\$1,193,000)
- (2017-2022) Air Force Office of Scientific Research – Plasma Physics, *Computational Non-Ideal Plasma Physics* , Co-PI: A.J. Christlieb, (\$3,085,000)
- (2015-2018) National Science Foundation – DMS – Computational Mathematics, *A practical approach to Rothes method: The Method of Lines Transpose*, PI: A.J. Christlieb, (\$206,000)
- (2015-2018) National Aeronautics and Space Administration – ATFP program – *Beyond the fluid approximation: Improved modeling of the intracluster plasma*, Co-PI: A.J. Christlieb, (\$631,630)
- (2015-2018) Air Force Office of Scientific Research – Computational Mathematics, *Time domain Particle-Particle Particle-Mesh methods* , PI: A.J. Christlieb, (\$435,000)

#### COMPLETED GRANTS

- (2014-2017) New Mexico Consortium *Modeling Quantum Effects in Ultra Cold Plasmas*, Co-PI: A.J. Christlieb, (\$160,318)
- (2013-2016) Oak Ridge National Lab – **LDRD University Grant** – *Novel Time Stepping Methods for Stiff Kinetic Problems*, PI: A.J. Christlieb, (\$75,000)
- (2012-2017) Air Force Office of Scientific Research – **BRI Cold Atoms** –, *Modeling and Simulation of Strongly Coupled Plasmas*, PI: A.J. Christlieb, (\$1,025,354)



- (2012-2015) Air Force Office of Scientific Research – **BRI Fault Tolerant Algorithms** –, *Fault Tolerant Paradigms*, Co-PI: A.J. Christlieb, (\$677,128)
- (2012–2013) Air Force Research Lab – Edward’s Air Force Base, *Embedded Boundary Methods for Particle In Cell*, PI: A.J. Christlieb, (\$151,000 donation to MSU)
- (2012-2013) Air Force Office of Scientific Research – **Phase One STTR with TechX**, *Modeling Tools for Plasmas in the Strongly-Coupled State*, PI: A.J. Christlieb, (\$100,000 – MSU part \$40,000)
- 2011-2014 MSU Foundation – SPG, *Dynamic Optimization of Non-Equilibrium Plasma Assisted Combustion*, PI: A.J. Christlieb, (\$400,000)
- (2011-2014) National Science Foundation – DMS – Computational Mathematics, *Temporal Multi-Scale Simulation Tools for Kinetic Plasma Equations*, PI: A.J. Christlieb, (\$200,000)
- (2011-2014) Air Force Office of Scientific Research – Computational Mathematics, *Method of Lines Transpose, An Implicit Vlasov Maxwell Solver*, PI: A.J. Christlieb, (\$435,000)
- (2011–2012) Air Force Research Lab – IPA **Extension** – Kirtland Air Force Base, *Extended Particlein-Cell*, PI: A.J. Christlieb, (\$58,000)
- (2009-2012) National Science Foundation – **Joint DMS and Chemistry – SOLAR**, *Design and Development of Efficient Solid-State Dye-Sensitized Solar Cells*, Co-PI: A.J. Christlieb, (\$1.9M - \$300,000 of grant for a Math Post Doc to Work with Christlieb on Scientific Computing)
- (2010-2011) Air Force Office of Scientific Research– **One year additional Effort - Young Investigator Award**, *Grid-Free Electromagnetic Plasma Simulations*, PI: A.J. Christlieb, (\$79,000)
- (2009-2011) Air Force Office of Scientific Research – Computational Mathematics, *Solving Differential Equations with Random Ultra-Sparse Numerical Discretizations*, UC-Boulder-PI: D.M. Bortz (UC-B 89,031), MSU-CoPI: A.J. Christlieb, (MSU \$58,361)
- (2009–2011) Air Force Research Lab – IPA renewal – Kirtland Air Force Base, *Extended Particlein-Cell*, PI: A.J. Christlieb, (\$128,000)
- (2008-2011) National Science Foundation – DMS – Computational Mathematics, *Systematic Lagrangian Methods for Transport Problems*, PI: A.J. Christlieb, (\$167,000).
- (2007–2010) Air Force Office of Scientific Research – **Young Investigator Award** – Computational Mathematics, *Grid-Free Electromagnetic Plasma Simulations*, PI: A.J. Christlieb, (\$300,156)
- (2008) IPAM – UCLA – Visiting Scholar Fellowship, *Quantum and Kinetic Transport: March 10–June 12, 2009*, PI: A.J. Christlieb (\$8,000 Housing Support)
- (2008) Air Force Office of Scientific Research – Computational Mathematics, *MSU Multi-Scale Modeling and Simulation Workshop*, PI: A.J. Christlieb and Co-PI: G. Bao, (\$6,995).
- (2007–2009) Air Force Research Lab – IPA – Kirtland Air Force Base, *Extended Particlein-Cell*, PI: A.J. Christlieb, (\$94,000)

- (2007–2008) Air Force Office of Scientific Research – Space Sciences Division, *Grid-Free Electrostatic Plasma Simulations*, PI: A.J. Christlieb, (\$74,000 )
- (2006–2007) Air Force Research Lab – Edwards Air Force Base, *Error analysis of combined Monte Carlo Particle-in-Cell codes*, PI: A.J. Christlieb, (\$50,000 donation to MSU)
- (2006) NRC – Air Force Office of Scientific Research **Summer Faculty Fellow**, *Grid-Free Laser Plasma Simulations*, PI: A.J. Christlieb (\$10,000 summer support)
- (2005–2008) Air Force Office of Scientific Research – Space Sciences Division, *A Grid-Free Approach for Plasma Simulations*, PI: A.J. Christlieb and Co-PI: R. Krasny, (\$264,139)
- (2005–2006) Air Force Research Lab – Edward’s Air Force Base, *Hybrid Plasma Kinetics Modeling*, PI: A.J. Christlieb and Co-PI: R. Krasny, (\$49,396 )
- (2005–2006) Air Force Research Lab – Edward’s Air Force Base, *Treecode Laser Plasma Simulations*, PI: A.J. Christlieb and Co-PI: R. Krasny, (\$45,364 )
- (2002) Rackham Faculty Development Grant, University of Michigan, *Development of Simplified Models for Multi-Scale Gas Flow*, PI: A.J. Christlieb (\$7,000 summer support)

### COMPLETED CONSULTING

- (2009-2011) Air Force Office of Scientific Research – STTR Phase II – team UCLA, MSU and NumerEx, *Development of a Renormalization Group Approach to Multi-Scale Plasma Physics Computation*, (\$750,000 ) – Consultant to NumerEx – co-wrote 1/3 of proposal – Tasks: provide simulation expertise, collaborate on employing RG in a multi model approach.
- (2008) Air Force Office of Scientific Research – STTR Phase I – team UCLA and NumerEx, *Development of a Renormalization Group Approach to Multi-Scale Plasma Physics Computation*, (\$100,000 ) – Consultant to NumerEx.

### JOURNAL PUBLICATIONS

1. A.J. Christlieb, W.N.G. Hitchon and E. Keiter, “A Computational Investigation of the Effects of Varying Discharge Geometry for Inductively Coupled Plasmas”, *IEEE Transactions on Plasma Science*, 28 (6): 2214-2231 DEC 2000
2. A.J. Christlieb and W.N.G. Hitchon, “Three-Dimensional Solutions of the Boltzmann Equation: Heat Transport at Long Mean Free Paths”, *Physical Review E*, 65 (5): Art. No. 056708 Part 2 MAY 2002
3. A.J. Christlieb, W.N.G. Hitchon, I.D. Boyd and Q. Sun, “Kinetic Description of Flow Past a Micro-Plate”, *Journal of Computational Physics*, 195 (2): 508-52 APR 2004
4. A.J. Christlieb, R. Krasny and J.P. Verboncoeur, “Efficient Particle Simulation of a Virtual Cathode using a Grid-Free Treecode Poisson Solver”, *IEEE Transactions on Plasma Science*, 32 (2): 384-389 Part 1 APR 2004
5. A.J. Christlieb, J.A. Rossmannith and P. Smereka, “The Broadwell Model in a Thin Channel”, *Communications in Mathematical Sciences*, 2: 443-476, 2004

6. A.J. Christlieb, R. Krasny and J.P. Verboncoeur, “A Treecode Algorithm for Simulating Electron Dynamics in a Penning-Malmberg Trap”, *Computer Physics Communications*, 164: 306-310, 2004
7. A.J. Christlieb, R. Krasny, J.P. Verboncoeur, J. Emhoff and I.D. Boyd , “Grid-Free Plasma Simulation Techniques”, *IEEE Trans. on Plasma Science*, 34 (2): 149-165 Part 1 APR 2006
8. A. VanderWyst, A.J. Christlieb, M. Sussman, and I.D. Boyd, “Simulation of Liquid Metal Droplets from Field Emission”, *Comm. in Computational Physics* 2(4): 640-661, 2007.
9. S. Olson and A.J. Christlieb, “Grid-Free Direct Simulation Monte Carlo”, *Journal of Computational Physics* 22717, 8035-8064, 2008.
10. A.J. Christlieb, B. Ong and J. Qiu, “Comments on High Order Integrators Embedded within Integral Deferred Correction Methods”, *Communications in Applied Math and Computational Science*, 41, 27–56, 2009
11. A.J. Christlieb, W.N.G. Hitchon, J.E. Lawler and G.G. Lister, “Integral and Lagrangian Simulations of Particle and Radiation Transport in Plasma.”, *Journal of Physics D: Applied Physics*. 42 (2009) 194007 .
12. A.J. Christlieb, B. Ong and J. Qiu, “Integral Deferred Correction Methods Constructed with High Order Runge-Kutta Methods”, *AMS–Mathematics of Computation*, 79, 761–783, 2010.
13. J. Qiu and A.J. Christlieb, “A Conservative high order semi-Lagrangian method for the Vlasov Equation”, *Journal of Computational Physics*, 229(4), 1130–1149, 2010.
14. A.J. Christlieb, C.B. Macdonald and B. Ong, “Parallel High-Order Integrators”, *SIAM Journal on Scientific Computing*, 32, 818–835, 2010.
15. S. Olson, A.J. Christlieb and Fredrik Fatemi, “PID feedback for load-balanced parallel grid-less DSMC”, *Computer Physics Communications*, issn 0010-4655, 2010.
16. A.J. Christlieb and B. Ong, “Implicit Parallel Time Integrators”, *Journal of Scientific Computing*, issn 0885–7474, 2010.
17. A.J. Christlieb, M. Morton, B. Ong and J. Qiu, “Semi-Implicet Integral Deferred Correction Constructed with High Order Additive Runge-Kutta Methods”, *Communications in Mathematical Sciences* 9(3), 879–902, 2011
18. C. Shen, J. Qiu and A.J. Christlieb, “High Order Adaptive Mesh Refinement Based on Weighted Essentially Non-Oscillatory Schemes”, *Journal of Computational Physics*, 230(10), 3780–3802, 2011
19. N. Gavish, J. Jones, Z. Xu, A.J. Christlieb and K. Promislow, “Variational Models of Network Formation and Ion Transport: Applications to Perfluorosulfonate Ionomer Membranes”, *Polymers*, 4(1), 630–655, 2012
20. A.J. Christlieb, K. Promislow and Z. Xu “On the unconditionally gradient stable scheme for Cahn-Hilliard equation and its implementation with Fourier method”, *Communications in Mathematical Sciences* 11(2), 345–360, 2012

21. A.J. Christlieb, R Haynes, B. Ong, “A Parallel Space-Time Algorithm”, *SIAM Journal on Scientific Computing*, 34(5):233-248, 2012
22. D. Lawlor, Y. Wang, and A.J. Christlieb, “Adaptive Sub-Linear Time Fourier Algorithms”, *Advances in Adaptive Data Analysis*, 5(01), 2013
23. K. Promislow, J. Jones, Z. Xu, N. Gavish and A.J. Christlieb, “Variational Models of Pore Networks in Ionomer Membranes: The Role of Electrostatics”, *ECS Transactions*, 50(2), 161–173, 2013
24. M. Causley and A.J. Christlieb, “A-Stable Higher order schemes for the wave equation using a recursive convolution approach” , *SIAM Journal on Numerical Analysis*, 52(1), 220–235, 2014
25. Y. Cheng, A.J. Christlieb, X. Zhong, “Energy-conserving discontinuous Galerkin methods for the Vlasov Ampere system ”, *Journal of Computational Physics*, 256, 630–655, 2014
26. A.J. Christlieb, J. Jones, K. Promislow, B. Wetton, M. Willoughby, “High accuracy solutions to energy gradient flows from material science models”, *Journal of Computational Physics*, 257, Part A, 193–215, 2014
27. A.J. Christlieb, W. Guo, M. Morton and J. Qiu, “A High Order Time Splitting Method Based on Integral Deferred Correction for Semi-Lagrangian Vlasov Simulations”, *Journal of Computational Physics*, 267, 7–27, 2014
28. M. Causley, A.J. Christlieb, B. Ong, L. VanGroningen, “Method of Lines Transpose: An Implicit Solution to the One Dimensional Wave Equation” , *AMS – Mathematics of Computation*, 83, 2763–2786, 2014
29. A.J. Christlieb, Y. Guclu, D. Seal, “High-order multiderivative time integrators for hyperbolic conservation laws”, *Journal of Scientific Computing*, 60 (1), 101–140, 2014
30. A.J. Christlieb, J.A. Rossmannith, Q. Tang, “Finite Difference Weighted Essentially Non-Oscillatory Schemes with Constrained Transport for Ideal Magnetohydrodynamics”, *Journal of Computational Physics*, 268, 302–325, 2014
31. T. Xiong, J. Qiu, Z. Xu, A. Christlieb, “High Order Maximum Principle Preserving Semi-Lagrangian Finite Difference WENO schemes for the Vlasov Equation”, *Journal of Computational Physics*, 273, 618–639, 2014
32. S. Olson, G. Raithel and A.J. Christlieb “Pressure-Driven Evaporative Cooling in Atom Guides”, in *Physical Review A*, 90, 043612, 2014
33. Y. Guclu, A.J. Christlieb, W.N.G. Hitchon, “Arbitrarily high order Convected Scheme solution of the Vlasov-Poisson systemr”, *Journal of Computational Physics*, 270, 711–752, 2014
34. Y. Cheng, A.J. Christlieb, X. Zhong, “Energy-conserving Discontinuous Galerkin Methods for the Vlasov-Maxwell System”, *Journal of Computational Physics*, 279, 145–173, 2014

35. A.J. Christlieb, Y. Liu, Q. Tang, Z. Xu, “High order parametrized maximum-principle-preserving and positivity-preserving WENO schemes on unstructured meshes”, *Journal of Computational Physics*, 281, 334–351, 2015
36. A. J. Christlieb, C. B. Macdonald, B. W. Ong and R. J. Spiteri, “Revisionist Integral Deferred Correction with Adaptive Error and Stepsize Control”, *Communications in Applied Mathematics and Computational Science*, 10(1), 1–25, 2015
37. A.J. Christlieb, Y. Liu, Z. Xu, “High order operator splitting methods based on an integral deferred correction framework”, *Journal of Computational Physics*, 294, 224–242, 2015
38. Y. Cheng, A.J. Christlieb, X. Zhong, “Energy-Conserving Numerical Simulations of Electron Holes in Two-Species Plasmas ”, *European Physical Journal D*, 69(3),1–19, 2015
39. Y. Cheng, A.J. Christlieb, X. Zhong, “Numerical study of the two-species Vlasov-Ampère system: energy-conserving schemes and the current-driven ion-acoustic instability,”, *Journal of Computational Physics*, 288, 66–85, 2015
40. A.J. Christlieb, Y. Liu, Q. Tang, Z. Xu, “Positivity-Preserving Finite Difference WENO Schemes with Constrained Transport for Ideal Magnetohydrodynamic Equations”, *SIAM Journal on Scientific Computing* 37(4), A1825–A1845, 2015
41. A.J. Christlieb, Y. Guclu, D. Seal, “The Picard integral formulation of weighted essentially non-oscillatory schemes”, *SIAM Journal on Numerical Analysis* 53(4), 1833–1856, 2015
42. A.J. Christlieb, D.C. Seal, Q. Tang, and Z. Xu, “An explicit high-order single-stage single-step positivity-preserving finite difference WENO method for the compressible Euler equations”, *Journal on Scientific Computing*, Dec 10th, 1–20, 2015
43. D. Lawlor, Y. Wang, and A.J. Christlieb, “A Multiscale Sub-linear Time Fourier Algorithm for Noisy Data”, *applied computational harmonic analysis* 40(3), 553–574, 2016
44. M. Causley, H. Cho, A.J. Christlieb, D. Seal, “Method of lines transpose: High order L-stable  $O(N)$  schemes for parabolic equations using successive convolution”, *SIAM numerical analysis*, 54(3), 1635–1652, 2016
45. A.J. Christlieb, S. Gottlieb, Z.J. Grant, and D.C. Seal, “Explicit Strong Stability Preserving Multistage Two-Derivative Time Stepping Schemes”, *Journal of Scientific Computing*, 1–29, 2016
46. W. Guo, G. Lin, A.J. Christlieb, J. Qiu, “An Adaptive WENO Collocation Method for the Solution of Stochastic Differential Equations”, *Mathematics*, 4(2), 29, 2016
47. A.J. Christlieb, X. Feng, D.C. Seal, Q. Tang, “A high-order positivity-preserving single-stage single-step method for the ideal magnetohydrodynamic equations”, *Journal of Computational Physics*, 316, 218–242, 2016
48. M. Bettencourt M. Causley, A.J. Christlieb, and E. Wolf, “A Particle-In-Cell Method for The Simulation of Plasmas Based on An Unconditionally Stable Field Solver”, *Journal of Computational Physics*, 326, 342–372, 2016

49. G. Dharuman, M.S. Murillo, J. Verboncoeur, A.J. Christlieb, “Atomic bound state and scattering properties of effective momentum-dependent potentials”, *Physical Review E*, 94(4), 043205, 2016
50. A.J. Christlieb, Y. Jiang, W. Guo, “A WENO-based Method of Line Transpose Approach for Vlasov Simulations”, *Journal of Computational Physics*, 327, 337–367, 2016
51. M. Causley, A.J. Christlieb, E. Wolf, “Method of Lines Transpose: an efficient unconditionally stable solver for wave propagation”, *Journal of Scientific Computing*, 70(2), 892–921, 2017
52. A.J. Christlieb B. Ong and B.D. Quaife “A family of high order regularized Kernels for the Poisson’s equation in 1,2 and 3 dimensions”, *Journal of Scientific Computing*, 71(3), 1212–1237, 2017
53. Y. Cheng, A.J. Christlieb, W. Guo, B. Ong, “An Asymptotic Preserving Maxwell Solver Resulting in the Darwin Limit of Electrodynamics”, *Journal of Scientific Computing*, 71(3), 959–993, 2017
54. M. Causley, H. Cho, A.J. Christlieb, “Method of lines transpose: Energy gradient flows using direct operator inversion for phase field models”, *SIAM Journal on Scientific Computing*, 39(5), B968–B992, 2017
55. M. Crockatt, A.J. Christlieb, C.K. Garrett, C.D. Hauck “An arbitrary-order, fully implicit, hybrid kinetic solver for linear radiative transport using integral deferred correction”, *Journal of Computational Physics*, 346, 212–241, 2017
56. A.J. Christlieb, Y. Jiang, W. Guo, “Kernel Based High Order” Explicit” A-Stable Scheme for Nonlinear Degenerate Advection-Diffusion Equations”, *submitted and arXiv:1707.09294*
57. A.J. Christlieb, Y. Jiang, W. Guo, “A Kernel Based High Order” Explicit” Unconditionally Stable Scheme for Time Dependent Hamilton-Jacobi Equations”, *submitted and arXiv:1802.00536*
58. M. Crockatt, A.J. Christlieb, C.K. Garrett, C.D. Hauck “Hybrid methods for radiation transport using diagonally implicit runge-kutta and space-time discontinuous galerkin time integration”, *Submitted*
59. M. Crockatt, A.J. Christlieb “Low-storage integral deferred correction methods for scientific computing, In preparation.”, *Submitted*
60. B.Choi, A.J. Christlieb, Y. Wang, “Multi-dimensional Sublinear Sparse Fourier Algorithm”, *submitted*
61. A.J. Christlieb, X. Feng, Y. Jiang, T. Qi, “A high-order finite difference WENO scheme for ideal magnetohydrodynamics on curvilinear meshes”, *submitted and arXiv:1711.07415*

## REFEREED CONFERENCE PAPERS

1. A.J. Christlieb and W.N.G. Hitchon, “An Accurate Kinetic Scheme for 3D Solutions of the Boltzmann Equation”, Proceedings of the *23rd International Symposium on Rarefied Gas Dynamics*, Whistler, British Columbia, Canada, July 20-25, 2002

2. A.J. Christlieb, W.N.G. Hitchon, I.D. Boyd and Q. Sun, “Application of the Transition Probability Matrix Method to High Knudsen Number Flow Past a Micro-Plate”, Proceedings of the *23rd International Symposium on Rarefied Gas Dynamics*, Whistler, British Columbia, Canada, July 20-25, 2002
3. A.J. Christlieb, J.A. Rossmannith and P. Smereka, “The Limiting Behavior of the Broadwell Model: Flow in a Thin Channel”, Proceedings of the *24th International Symposium on Rarefied Gas Dynamics*, Bari, Italy, July 10-15, 2004
4. A.J. Christlieb, R. Krasny, Emhoff and I.D. Boyd, “Grid-free Plasma Simulations Based on Hierarchical Treecode Field Solvers”, Proceedings of the *24th International Symposium on Rarefied Gas Dynamics*, Bari, Italy, July 10-15, 2004
5. A. VanderWyst, A. Christlieb, M. Sussman, and I.D. Boyd, “Simulations of Charged Droplets Using Level Sets and the Boundary Integral Formulation of Electric Fields”, *2nd Colloid Thruster/Nano Electrojet Workshop at MIT*. Cambridge, MA, April 2005
6. A. VanderWyst, A. Christlieb, M. Sussman, and I.D. Boyd, “Boundary Integral Formulation of Electric Fields in Level Set Simulation of Charged Droplets”, *36th AIAA Plasmadynamics and Lasers Conference*. Toronto, Canada, June 2005
7. A. VanderWyst, A. Christlieb, M. Sussman, and I.D. Boyd, “Level Set Simulations of Charged Droplets Using a Boundary Integral Method”, *29th International Electric Propulsion Conference (IEPC)*. Princeton, NJ, November 2005
8. J. Jones, Z. Xu, A.J. Christlieb, and K. Promislow, “Using GPGPU to Enhance Simulation of the Functionalized Cahn-Hilliard Equation”, *Application Accelerators in High Performance Computing (SAAHPC), 2012 IEEE Symposium on*, 153–156, 2012
9. N. Jelic, L. Kos, J. Krek, J. Kovacic, T. Gyergyek, A. J. Christlieb, J. P. Verboncoeur, “Ionization front in a gas-filled diode during electrical breakdown” *49th International Conference on Microelectronics, Devices and Materials.*, to appear, 2013

#### **UN-REFEREED PAPERS**

1. D.M. Bortz and A.J. Christlieb , “Space Mesh Recovery for Boundary Value Problems Using Random Numerical Discretization”, *Sept 2011, arXiv:1103.5268*
2. A.J. Christlieb, A. Melfi, B. Ong, “Parallel Semi-Implicit Time Integrators”, *Sept 2012, arXiv:1209.4297v1*

#### **TEACHING INTERESTS**

Applied Mathematics, Scientific Computing, Dynamical Systems, Partial Differential Equations, Perturbation Methods

#### **TEACHING**

Michigan State University

Fall 2016 (CMSE 890) Paradigm Shifts In Parallel Computing, Algorithms for the GPGPU

Fall 2013 (MTH 955) Paradigm Shifts In Parallel Computing, Algorithms for the GPGPU  
(CSE 251) Intro to C programming for electrical engineers

Fall 2012 Sabbatical

Fall 2011 (MTH 955) Paradigm Shifts In Parallel Computing, Algorithms for the GPGPU

Spring 2011 (MTH 950) Numerical Partial Differential Equations

Fall 2010 (MTH 852) Numerical Ordinary Differential Equations

Spring 2010 (MTH 442) Partial Differential Equations

Fall 2009 (MTH 852) Numerical Ordinary Differential Equations

Fall 2008 (MTH 496) Capstone Class - Topic: Numerical Methods for Boundary  
Value Problems  
(MTH 852) Numerical Ordinary Differential Equations

Spring 2008 (MTH 442) Partial Differential Equations

Fall 2007 (MTH 852) Numerical Ordinary Differential Equations

Spring 2007 (MTH 950) Numerical Partial Differential Equations

Fall 2006 (MTH 132) Calculus 1

University of Michigan – Ann Arbor

Fall 2005 (Math 404) Intermediate Differential Equations–Dynamical Systems

Summer 2005 (Math 471) Introduction to Numerical Methods

Winter 2005 (Math 454) Boundary Value Problems for Partial Differential Equations

Fall 2004 (Math 471) Introduction to Numerical Methods  
(Math 404) Intermediate Differential Equations–Dynamical Systems

Summer 2004 (Math 454) Boundary Value Problems for Partial Differential Equations

Winter 2004 (Math 558) Graduate Applied Dynamical Systems

Fall 2003 (Math 404) Intermediate Differential Equations–Dynamical Systems

Winter 2003 (Math 471) Introduction to Numerical Methods

Fall 2002 (Math 471) Introduction to Numerical Methods  
(Math 371) Introduction to Numerical Methods for Engineers

University of Michigan – Dearborn

Winter 2001 (Math 115) Calculus 1  
(Math 217) Matrix Algebra  
(ECE 314) Introduction to Analog Filter Design

Fall 2000 (Math 115) Calculus 1  
(Math 116) Calculus 2  
(ECE 305) Introduction to Circuit Theory

Summer 2000 (Math 115) Calculus 1

**SERVICE**

Associate Director • Michigan Center for Industrial and Applied Mathematics (MCIAM),  
<http://www.math.msu.edu/related/mciam/>

Editor • Associate Editor for International Journal of Plasma Science and



- Engineering, <http://www.hindawi.com/journals/ijpse/editors.html>
- Grants
- Reviewer for NSF computational physics,
  - Reviewer for DoE Advanced Scientific Computing Research (ASCR),
  - International expert for review of the Kaliffe team at INRIA proposal, (2013)
  - Reviewer for Air Force Office of Scientific Research - Computational Mathematics (2008,2009,2011,2012, 2013,2014,2015)
  - Reviewer for National Science Foundation - Division of Physics Joint DOE-NSF Plasma Physics Initiative (2006)
- Journals
- Reviewer for *SIAM Journal on Multiscale Modeling and Simulation*, *SIAM Review*, *Communications in Mathematical Sciences*, *Journal of Applied Physics*, *Physics of Plasmas*, *Journal of Computational Physics*, *Journal of Scientific Computing*
- Courses
- Taught the third semester qualifying sequence course, MTH 852. Wrote and graded the portion of the Numerical Analysis qualifying exam, Spring 2008 – 2011.
  - Developed a new courses on paradigm shifts in multi-core computing, MTH 995, Fall 2011 and Fall 2013.
  - Part of a team developing a graduate certificate at MSU on Applied Computing, Fall 2012–Present
- Committees
- Served on the Michigan State University Department of Mathematics Advisory Committee (2013-2014)
  - Served on the Michigan State University Department of Mathematics Highering Committee (2011-2012)
  - Served on the Michigan State University Department of Mathematics Highering Committee (2010-2011)
  - Served on the Michigan State University Department of Mathematics Advisory Committee (2010-2011)
  - Served on the Michigan State University Department of Mathematics Graduate Curriculum and Library Committee (2010-2011)
  - Served on the Michigan State University Department of Mathematics Undergraduate Curriculum and Library Committee (2009-2010)
  - Served on the Michigan State University Department of Mathematics Computer Committee and Library Committee (2007-2008)
  - Served on the Michigan State University Department of Mathematics Hiring Committee (2006-2007)
  - Served on the University of Michigan Mathematics Department Computer Committee (2004-2006)
- Faculty Advisor
- MSU chapter of Pi Mu Epsilon Fall 2007-2012
- VIGRE
- Fall 2002 and Fall 2003, participated in the VIGRE Seminar by lecturing on Scientific Computing and Dynamics of Numerics ([www.math.lsa.umich.edu/seminars/vigre/](http://www.math.lsa.umich.edu/seminars/vigre/))
  - Winter 2003, participant in the VIGRE Working Group in Scientific Computing ([www.math.lsa.umich.edu/seminars/scicomp/](http://www.math.lsa.umich.edu/seminars/scicomp/))

- Winter 2004, organized and ran the VIGRE Working Group on Non-Linear Dynamical Systems  
([www.math.lsa.umich.edu/~christli/VIGRE\\_NLDS/VIGRE.html](http://www.math.lsa.umich.edu/~christli/VIGRE_NLDS/VIGRE.html))
- Fall 2002, participated in the University of Michigan King/Chavez/Parks program, an outreach program aimed at a raising the interest of disadvantaged middle school youths in physical sciences

## PROFESSIONAL ACTIVITIES

- Conference • Technical Area Chair for All of Basic Plasmas Physics, IEEE 2014 41<sup>th</sup> International Conference on Plasma Science, May 25-29, Washington, DC, USA
- Section Area Organizer for Computational Plasmas, IEEE 2013 40<sup>th</sup> International Conference on Plasma Science, June 16-21, San Francisco, California USA. <http://www.ece.unm.edu/ppps2013/>
- Technical Area Organizer for computational plasmas, IEEE 2012 39<sup>th</sup> International Conference on Plasma Science, June 8-12, Edinburgh, UK. <http://icops2012.lboro.ac.uk>
- Co-Organized the first two day MCIAM workshop (March 2008), “Multiscale Modeling, Analysis, and Simulations”, Michigan State University, East Lansing, Michigan, USA, March 27-28, 2008, <http://www.egr.msu.edu/mmas2008/>
- Section Chair 38th IEEE International Conference on Plasma Physics “Computational Methods”, Chicago, IL, June 26-30, 2011
- Minisymp. • Organized SIAM Minisymposiums for SIAM annual meeting “Method of Lines Transpose”, Boston, MA, July 11-15, 2016
- Co-Organized two part ICIAM Minisymposiums for seventh International Congress on Industrial and Applied Mathematics (ICIAM 11) “On Advanced Numerical Integrators Based on Defect Correction” Vancouver, Canada, July 18-22, 2011
- Co-Organized two part SIAM CSE Minisymposiums “On Advanced Numerical Methods for Plasma Simulations” Reno, NV, USA, Feb 28-March 4, 2011
- Co-Organized two part SIAM Annual Meeting “On Advanced Numerical Integrators Based on Defect Correction” Pittsburgh, Pa, July 12-26, 2010
- Co-Organized two part ICIAM Minisymposiums for Sixth International Congress on Industrial and Applied Mathematics (ICIAM 07), “Numerical Simulation of Plasma”, Zurich, Switzerland, July 16-20, 2007
- Organized three part SIAM Minisymposiums for SIAM Conference on Computational Science & Engineering (CSE07), State of the Art Algorithms for Computational Plasma Physics, Costa Mesa, California, Feb. 19-23, 2007
- Workshop • Lead Organizer for “2012 Algorithm and Model Verification and Validation for Kinetic Plasma Simulation Codes”, MSU, MI, USA November 12<sup>th</sup> - 15<sup>th</sup>, 2012, <http://www.egr.msu.edu/amvv2012/>

- Co-Organized three month IPAM workshop (Spring 2012), “Computational Methods in High Energy Density Plasmas” UCLA, LA, California, USA, March 12 - June 15, 2012, <http://www.ipam.ucla.edu/programs/pl2012/>
  - Fall 2006, Invited to participate in Institute for Mathematics and its Applications workshop on Negative Index Materials. Goal of the workshop is to introduce mathematicians to emerging problems in the field. University of Minnesota, twine cities, Oct. 2-4, 2006
  - Winter 2005, Invited to participate in Institute for Pure and Applied Mathematics workshop on Multiscale Processes in Fusion Plasmas. Goal of the workshop is to introduce mathematicians to problems in multi-scale fusion problems. University of California, Los Angeles, Ca. Jan. 10-14, 2005
  - Fall 2004, Invited to participate in the NASA R-Shield workshop. Goal of the workshop is to develop strategies for active shielding of spacecraft from radiation damage. University of Michigan, Ann Arbor, Mi., Aug. 16-17, 2004
  - Fall 2002, Invited to participate in Institute for Pure and Applied Mathematics workshop on Mathematics in Nanoscale Science and Engineering. Goal of the workshop is to develop/explore multi-scale problems. University of California, Los Angeles, Ca., Nov. 19-22, 2002
- Member
- Society for Industrial and Applied Mathematics, American Physical Society, Institute of Electrical and Electronics Engineers

## INVITED AND CONTRIBUTED TALKS/SEMINARS

- Invited** *A fast  $O(N)$  direct inversion of linear operators with applications to nonlinear partial differential equations*, A.J. Christlieb, Department of Mathematics, Applied Math Seminar, RWTH Aachen University, Aachen Germany, July 1, 2016
- Invited** *Steps towards a fast  $O(N)$  approach for direct inversion of linear operators with applications to nonlinear partial differential equations*, A.J. Christlieb, Department of Mathematics, Applied Math Seminar, University of North Carolina, Chapel Hill, April 8, 2016
- Invited** *Steps towards a fast  $O(N)$  approach for direct inversion of linear operators with applications to nonlinear partial differential equations*, A.J. Christlieb, Department of Scientific Computing Colloquium Florida State University, Tallahassee, March 2, 2016
- Invited** *Steps towards a fast  $O(N)$  approach for direct inversion of linear operators with applications to nonlinear partial differential equations*, A.J. Christlieb, Department of Mathematics, Applied and Interdisciplinary Mathematics Seminar, University of Michigan, Ann Arbor, Feb 19, 2016
- Invited** *Understanding Plasmas with a High Degree of Correlation Through Modeling: From Rydberg and Fermionic Plasmas to Penning Plasmas*, A.J. Christlieb, The 68th Gaseous Electronics Conference Honolulu, Hawaii, October 12-16, 2015
- Invited** *An A-Sable to All Orders Wave Propagation Method*, A.J. Christlieb,

- Department of Mathematics, Computational and Applied Mathematics  
Seminar, Purdue University, West Lafayette, Sep 20, 2013
- Invited** *A High Order A-Sable Wave Propagation Method*, A.J. Christlieb,  
Max-Planck-Institut für Plasmaphysik, NumKin 2013 Workshop, Munich,  
Germany, Sep. 2 - Sep. 6, 2013
- Invited** *Plasma Simulation Tools Based on Fast Summation*  
A.J. Christlieb, Seoul National University, Seoul, Korea - Hosted by Department of  
Nuclear Engineering (Prof. Y.S. Na), May 27, 2013
- Invited** *Plasma Assisted Combustion, Experiment and Simulation*  
A.J. Christlieb, Korean Advanced Institute of Science and Technology, Daejeon,  
Korea - Hosted by Department of Physics (Prof. Wonho Choi), May 24, 2013
- Invited** *An Overview of Plasma Simulation Tools Based on Fast Summation*  
A.J. Christlieb, National Fusion Research Institute, Gunsan, Korea - Hosted by  
the Plasma Added Manufacturing Lab (Dr. Miyoung Song), May 23, 2013
- Invited** *Plasma Assisted Combustion, Experiment and Simulation*  
A.J. Christlieb, Korean Research Institute of Standards and Science, Daejeon,  
Korea - Hosted by the Plasma Lab (Dr. Shinjae You), May 22, 2013
- Invited** *An Overview of Plasma Simulation Tools Based on Fast Summation*  
A.J. Christlieb, Pohang University of Science and Technology, Pohang, Korea -  
Hosted by the Department of Physics (Prof. Gunsu Yun), May 21, 2013
- Invited** *Method of Lines Transpose, a new class of Implicit Maxwell Solver*,  
A.J. Christlieb, Pusan National University, Pusan, Korea - Hosted by the  
Department of Electrical Engineering, May 16, 2013
- Invited** *Plasma Assisted Combustion, Experiment and Simulation*  
A.J. Christlieb, Pusan National University, Pusan, Korea - Hosted by the LINC  
center, Department of Mechanical Engineering, May 10, 2013
- Invited** *Treecode methods and there applications in simulating plasmas*,  
A.J. Christlieb, Pusan National University, Pusan, Korea - Hosted by the Plasma  
Lab (Prof. Hojun Lee), May 9, 2013
- Invited** *Multi Derivative Time Stepping Methods for Applied to Functionalized Cahn  
Hilliard Equations on GPGPUs*, A.J. Christlieb, SIAM CSE, Boston,  
Feb. 25–Mar. 1, 2013
- Invited** *Alternating Direction Implicit Method of Lines Transpose Maxwell Solver*  
A.J. Christlieb, Oak Ridge National Lab, Tennessee, Dec. 8, 2012)
- Invited** *Ultra Fast Spectral Methods Based on Compressed Sensing*  
A.J. Christlieb, ICERM, Brown, Aug. 6-10, 2012)
- Invited** *An Implicit Maxwell Solver based on the Method of Lines Transpose*,  
A.J. Christlieb, IPAM, UCLA, May 7-11, 2012
- Invited** *An Implicit Asymptotic Preserving Maxwell Solver*  
A.J. Christlieb, ICERM, Brown, Sep. 21, 2011
- Contributed *An Implicit Maxwell Solver*, A.J. Christlieb, 38th IEEE  
International Conference on Plasma Science, Monterey  
Illinois, USA, June 26–30, 2011

- Invited** *A High Order Adaptive Mesh Refinement Based on Point Wise WENO*  
A.J. Christlieb, Atmospheric Oceanic and Space Sciences, University of Michigan, Mar. 21, 2011
- Invited** *3D Penning Tap Simulations using Space-time Parallel Particle Solvers on GPGPUs* , A.J. Christlieb, SIAM CSE, RENO, Feb. 28–Mar. 4, 2011
- Invited** *Fast Summation Method for Electro-Magnetics using the Yukawa Screening Potential* , A.J. Christlieb, SIAM CSE, RENO, Feb. 28–Mar. 4, 2011
- Invited** *An Implicit Asymptotic Preserving Maxwell Solver*  
A.J. Christlieb, IPAM-Lake Arrow Head, Dec. 17, 2010
- Invited** *Numerical Simulation of a Microwave Plasma Assisted Combustion Torch*  
A.J. Christlieb, APS Division of Plasma Physics, Chicago, Nov. 8-12, 2010
- Invited** *Integral Deferred Correction and High Order Splitting Method for PDEs*  
A.J. Christlieb, SIAM Annual Meeting, Pittsburgh, July 12-16, 2010
- Invited** *An Implicit Asymptotic Preserving Maxwell Solver*  
A.J. Christlieb, SIAM Annual Meeting, Pittsburgh, July 12-16, 2010
- Invited** *A High Order Adaptive Mesh Refinement Based on Point Wise WENO*  
A.J. Christlieb, Applied Mathematics Colloquia, Duke, Mar. 1, 2010
- Invited** *A High Order Conservative Semi-Lagrangian Point Wise WENO Reconstruction Scheme for Vlasov Equations*, A.J. Christlieb,  
Applied Mathematics Colloquia, Department of Applied Mathematics,  
University of Washington, Nov. 12, 2009
- Invited** *Parallel Time Stepping Based on Integral Deferred Correction* ,  
A.J. Christlieb, Computational and Applied Mathematics Seminar, Department of  
Mathematics, Purdue University, West Lafayette, Indiana, USA, Oct 9, 2009
- Invited** *Integral Deferred Correction with High Order Correction Schemes*,  
A.J. Christlieb, AMS 2009 Spring Southeastern Section Meeting, Raleigh,  
NC April 4-5, 2009
- Invited** *A High Order Conservative Semi-Lagrangian Point Wise WENO Reconstruction Scheme for Vlasov Equations*, A.J. Christlieb,  
Institute for Pure and Applied Mathematics,  
Workshop on Computational Kinetic Theory, UCLA  
Los Angeles, CA, USA, March 30–April 3, 2009
- Invited** *Techniques for Multi-Scale Simulations* , A.J. Christlieb,  
ONR and AFOSR young investigator lecture series., ONR-AFOSR  
Washington DC, USA, October 21st 2008
- Invited** *Boundary Integral Corrected Particle-In-Cell*, A.J. Christlieb, K. Cartwright  
35th IEEE International Conference on Plasma Science, Congress Center  
Karlsruhe, Germany June 15 - 19, 2008
- Invited** *High Order Integrators and Fully Lagrangian Methods in Plasma Simulations*,  
A.J. Christlieb, MAGNETO-FLUID DYNAMICS SEMINAR, Department of

- Mathematics NYU, New York, New York, USA, April 17, 2008
- Invited** *A step towards temporal multi-scale problems*, A.J. Christlieb, Applied Mathematics Seminar, Department of Mathematics University of Michigan, Ann Arbor, Michigan, USA, April 4, 2008
- Invited** *A step towards temporal multi-scale problems*, A.J. Christlieb, Applied Mathematics Seminar, Department of Mathematics Pennsylvania State University, University Park, State College, Pennsylvania, USA, March 21, 2008
- Invited** *A step towards temporal multi-scale problems*, A.J. Christlieb, Applied Mathematics Seminar, Department of Mathematics University of Wisconsin, Madison, Wisconsin, USA, February 8, 2008
- Invited** *Lagrangian Methods for Problems in Plasma Physics*, A.J. Christlieb, Applied Mathematics Seminar, Department of Mathematics Wayne State University, Detroit, Michigan, USA, November 28, 2007
- Invited** *Lagrangian Methods for Problems in Plasma Physics*, A.J. Christlieb, Applied Mathematics Seminar, Department of Mathematics Florida State University, Tallahassee, Florida, USA, November 17, 2007
- Contributed *Boundary Integral Corrected Particle In Cell*, (Poster) A. Christlieb and K. Cartwright, APS 49<sup>th</sup> Annual Division of Plasma Physics, Orlando, Florida, USA , November 12-17, 2007
- Contributed *A step towards addressing the temporal multi-scale problem*, (Poster) J. Qui, B. Ong, A. Christlieb and R. Krasny, APS 49<sup>th</sup> Annual Division of Plasma Physics, Orlando, Florida, USA , November 12-17, 2007
- Invited** *Lagrangian Methods for Problems in Plasma Physics*, A.J. Christlieb, Applied Mathematics Seminar, Department of Mathematics Duke University Durham, North Carolina, USA, October 29, 2007
- Invited** *Grid-Free Electromagnetic Particle Simulations*, A.J. Christlieb, Air Force Office of Scientific Research – **Joint Program Review** Long Beach, California, USA, August 6-9, 2007
- Invited** *Grid-Free Numerical Methods* (Poster), A.J. Christlieb, Air Force Office of Scientific Research – **Scientific Advisory Broad Review** Washington DC, USA, August 1, 2007
- Invited** *Numerical Heating In Particle Codes*, A.J. Christlieb, 6th International Congress on Industrial and Applied Mathematics, Zurich, Switzerland, July 16-20, 2007
- Invited** *Boundary Integral Corrected Particle-In-Codes*, A.J. Christlieb, 6th International Congress on Industrial and Applied Mathematics, Zurich, Switzerland, July 16-20, 2007
- Invited** *Lagrangian Methods for Problems in Plasma Physics* , A.J. Christlieb,

- Applied Mathematics Seminar, Department of Mathematics University of North Carolina, Charlotte, North Carolina, USA, May 11, 2007
- Invited** *Lagrangian Methods for Problems in Plasma Physics*, A.J. Christlieb, Plasma Seminar, Department of Aerospace Engineering University of Washington, Sealtel, Washington, USA, May 7, 2007
- Invited** *Numerical Heating in fully Lagrangian Simulations*, A.J. Christlieb, SIAM Conference on Computational Science and Engineering, Costa Mesa, California, USA, February 19-23, 2007
- Invited** *Grid-Free Plasma Simulations*, A.J. Christlieb, Scientific Computing Seminar, Applied Math Department UC-Bolder, Bolder, Colorado, USA, February 5th, 2007
- Invited** *Fully Lagrangian Methods for Problems in Plasma Physics*, A.J. Christlieb, Engineering Noontime Research Seminars, Michigan State University, East Lansing, Michigan, USA, January 16th, 2007
- Invited** *Numerical Greens Function Techniques*, A.J. Christlieb, Workshop: Challenges, and Opportunities in Nano-Optics, Fudan University, Shanghai, China, January 5 - 9, 2007
- Contributed *Is PIC-MCC the right tool for the job?*, A.J. Christlieb and Jean-Luc Cambier, APS 48th Annual Division of Plasma Physics, Philadelphia, Pennsylvania, USA, October 30 - November 3, 2006
- Invited** *The state of Grid-Free Plasma Simulations*, A.J. Christlieb, R. Krasny, and Jean-Luc Cambier, SIAM annual meeting, Montreal, Boston, Massachusetts, USA, July 7 - 11, 2006
- Invited** *Grid-Free Plasma Simulations*, A.J. Christlieb, Invited to present to the director of AFOSR, Washington DC, USA, May 5th, 2006
- Invited** *Tolls for Grid-Free Plasma Simulations*, A.J. Christlieb, Scientific Computing Seminar, AFRL - Kirtland Air Force Base, New Mexico, USA, February 27th, 2006
- Invited** *Grid-Free Plasma Simulations*, A.J. Christlieb, Scientific Computing Seminar, Math Department UCLA, Los Angeles, California, USA, January 24th, 2006
- Invited** *A Boundary Integral/Treecode approach for Plasma Simulations*, A.J. Christlieb, Scientific Computing Seminar, AFRL - Edward's Air Force Base, California, USA, November 21st, 2005
- Contributed *Grid-Free Lagrangian Plasma Simulations with Dynamic Point Insertion*, A.J. Christlieb, R. Krasny and B. Soday, APS 47th Annual Division of Plasma Physics, Denver, Colorado, USA, October 24 - 28, 2005
- Invited** *Grid-Free Plasma Simulations*, A.J. Christlieb, R. Krasny, J.P. Verboncoeur, J. Emhoff and I.D. Boyd, 32nd IEEE International Conference on Plasma Science, Monterey, California, USA, June 18 - 23, 2005

- Contributed *Dynamics of a Penning-Malmberg Trap*, A.J. Christlieb and R. Krasny, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, USA, May 22-26, 2005
- Contributed *Grid-Free Plasma Simulations*, A.J. Christlieb and R. Krasny, SIAM Conference on Computational Science and Engineering, Orlando, Florida, USA, February 12-15, 2005
- Invited** *A Boundary Integral/Treecode approach for Plasma Simulations*, A.J. Christlieb, Michigan State University, Applied Mathematics Seminar, East Lansing, Michigan, USA, February 3, 2005
- Contributed *Grid Free Plasma Simulations for Arbitrary Domains with Applications to Ion Optics*, A.J. Christlieb, R. Krasny, J.W. Emhoff and I.D. Boyd, APS 46<sup>th</sup> Annual Division of Plasma Physics, Savannah, Georgia, USA, November 15-19, 2004
- Invited** *The Dynamics of a Penning-Malmberg Trap*, A.J. Christlieb, University of Michigan-Ann Arbor, Applied and Interdisciplinary Mathematics seminar, Ann Arbor, Michigan, USA, November 12, 2004
- Invited** *A Boundary Integral/Treecode approach for Plasma Simulations*, A.J. Christlieb, University of Wisconsin-Madison, Seminar in Plasma Physics, Madison, Wisconsin, USA, October 4, 2004.
- Contributed *The Limiting Behavior of the Broadwell Model (Flow in a Thin Channel)*, A.J. Christlieb, J. Rossmannith and P. Smereka, 24th Symposium on Rarefied Gas Dynamic, Bari, Italy, July 10-15, 2004.
- Contributed *Grid-free Plasma Simulations Based on Hierarchical Treecode Field Solvers*, A.J. Christlieb, R. Krasny, J.W. Emhoff and I.D. Boyd, 24th Symposium on Rarefied Gas Dynamics, Bari, Italy, July 10-15, 2004
- Contributed *Plasma Simulations for Arbitrary Domains with Applications to Ion Optics*, A.J. Christlieb, R. Krasny, J.W. Emhoff and I.D. Boyd, 24th Symposium on Rarefied Gas Dynamic, Bari, Italy, July 10-15, 2004
- Contributed *Grid-Free 1D Bounded Plasma Coupled to a Driving Circuit*, A.J. Christlieb, R. Krasny and J.P. Verboncoeur, 31st IEEE International Conference on Plasma Science, Baltimore, Maryland, USA, June 28-31, 2004
- Invited** *Simplified Kinetic Models (Flow in a Thin Channel)*, A.J. Christlieb, University of Michigan Aerospace Gas Dynamics Theory and Modeling Group Meeting, Ann Arbor, Michigan, USA, May 25, 2004
- Invited** *Dynamics of Numerics*, A.J. Christlieb, University of Michigan-Ann Arbor VIGRE seminar, Ann Arbor, Michigan, USA, April 28, 2004
- Contributed *A Grid-Free Treecode Field Solver for Plasma Simulations*, A.J. Christlieb and R. Krasny, APS Annual Meeting, Montreal, Quebec, Canada, March 22-26, 2004



- Invited** *Grid-Free Treecode Field Solver for Particle Simulations*, A.J. Christlieb, NASA Glenn Research Center Solar Circle Seminar, Cleveland, Ohio, USA, November 25, 2003
- Invited** *A Grid-Free Treecode Field Solver for Particle Simulations With Arbitrary Geometry*, A.J. Christlieb, University of California-Berkeley Plasma Theory and Simulation Seminar series, Berkeley, California, USA, November 14, 2003
- Contributed *A Grid-Free Treecode Field Solver for Plasma Simulations with Application to a Confined Electron Column in a Penning-Malmberg Trap*, A.J. Christlieb, R. Krasny and J.P. Verboncoeur, 18th International Conference on Numerical Simulation of Plasmas, Cape Cod, MA, USA, September 7-10, 2003
- Contributed *A Grid-Free Treecode Poisson Solver for Charged Particle Simulations*, A.J. Christlieb and R. Krasny, SIAM annual meeting, Montreal, Quebec, Canada, June 16-20, 2003
- Contributed *An Investigation of Efficient Grid-less Treecode Poisson Solvers for Charged Particle Simulations*, A.J. Christlieb, R. Krasny and J.P. Verboncoeur, 30th IEEE International Conference on Plasma Science, Jeju, Korea, June 2-5, 2003
- Invited** *A Grid-Free Approach to Particle Simulations*, A.J. Christlieb, University of Michigan Aerospace Gas Dynamics Theory and Modeling Group Meeting, Ann Arbor, Michigan, USA, April 21, 2003
- Invited** *Kinetic Simulations of Low Density Plasmas*, A.J. Christlieb, University of Michigan-Ann Arbor Applied and Interdisciplinary Mathematics seminar, Ann Arbor, Michigan, USA, November 14, 2003
- Contributed *An Accurate Kinetic Scheme for 3D Solution of the Boltzmann Equation*, A.J. Christlieb and W.N.G. Hitchon, 23rd Symposium on Rarefied Gas Dynamic, Whistler, British Columbia, Canada, July 20-25, 2002
- Contributed *Application of the Transition Probability Matrix Method to High Knudsen Number Flow Past a Micro-Plate*, A.J. Christlieb, W.N.G. Hitchon, Q. Sun and I.D. Boyd, 23rd Symposium on Rarefied Gas Dynamic, Whistler, British Columbia, Canada, July 20-25, 2002
- Contributed *A self consistent kinetic scheme for ions in complex geometry*, A.J. Christlieb and W.N.G. Hitchon, 52nd Gaseous Electronics Conference, Norfolk, Virginia, USA, October 5-8, 1999. Poster Session on Transport Phenomenon