Dr. K. D. LEKA
Curriculum Vitae
NorthWest Research Associates • 3380 Mitchell Lane, Boulder, Colorado, USA 80303
Ph: (303) 415-9701 x219 • Email: leka@nwra.com • ORCID: 0000-0003-0026-931X

General Research Interests:

Validation Science for Space Weather Research: How well do we do what we do? How can we tell? These are topics of interest not solely for algorithms in transition to operations, but for scientific research as a whole. For solar physics this question is especially challenging given the sparse remotely-sensed data coupled with even sparser in-situ data that supplies "truth". My research employs models, multiple-source complementary data, and quantitative metrics – both standard and newly developed – to answer this question for a variety of solar and space physics targeted algorithms.

Solar Active Region Structure and Evolution: Solar magnetic phenomena such as sunspots form basic tracers of the solar magnetic dynamo and activity cycle; as such, they are of fundamental interest for stellar physics and astrophysics in general. My research interests center on the structure and evolution of sunspots and active regions (groups of sunspots), including sunspot development, evolution, and decay. Multiple observational techniques and data sources are employed to sample subsurface, visible surface, chromosphere, and into the outer corona, often incorporating numerical models.

Solar flares: Solar flares – the sudden release of energy that results from magnetic reconnection in the solar atmosphere – produce dramatic increases in solar high-energy output. Flares are intimately related to coronal mass ejections, which remove mass and magnetic plasma from the Sun, and to processes that accelerate particles to MeV+ energies. My research centers on understanding the causes of solar flares and designing research efforts for improved forecasting and validation methodology for these phenomena affecting the Earth and its space environs.

Spectropolarimetry, Vector Magnetograph Instrument Development and Analysis Techniques: Inferring the magnetic fields on the Sun is accomplished through the analysis of the polarization state of magnetically-sensitive spectral lines. From commissioning hardware to developing and distributing community analysis software, my primary expertise within solar physics is spectropolarimetry and magnetic field analysis, including the quest for routine height-gradient information from high-quality data such as from the Japan/US *Hinode* satellite.

Education:

1995 Ph.D. (Astronomy) University of Hawai'i
   Dissertation: "Are Solar Emerging Active Regions Carrying Electric Current?"
   Committee Chair: Dr. Richard C. Canfield
1992 M.S. (Astronomy) University of Hawai'i
1989 B.S. (Astronomy and Physics) Yale University
   Senior Thesis: "Models of Solar-Analog Asteroseismology Candidates"
   Advisors: Drs. Pierre Demarque, David Guenther

Appointments:

2017 – 2025: Designated Foreign Professor, Institute for Space-Earth Environmental Research, Nagoya University, Nagoya, Japan
2003 – present: Senior Research Scientist, NorthWest Research Associates, Boulder Office (formerly Colorado Research Associates (CoRA)), Boulder, Colorado
1998 – 2003: Research Scientist, NorthWest Research Associates, CoRA Division, Boulder, Colorado

1997 – 1998: Research Associate, National Research Council, National Oceanic and Atmospheric Administration (NOAA)/Space Environment Center (SEC), Boulder, Colorado

1994 – 1997: Postdoctoral Fellow, Advanced Study Program, National Center for Atmospheric Research (NCAR), Boulder, Colorado

1991 – 1994: Research Assistant under Dr. Richard C. Canfield, University of Hawai'i Institute for Astronomy, Honolulu, Hawai'i and Mees Solar Observatory, Haleakalā, Maui, Hawaii; ground-based support team member for the United States/United Kingdom/Japan *Yohkoh* mission, with duties at the Institute for Space and Astronautical Sciences, Fuchinobe, Japan.

1992: Lecturer, University of Hawai'i College of Continuing Education, Honolulu, Hawai'i

1989 – 1991: Research Assistant for Dr. Richard C. Canfield, University of Hawai'i Institute for Astronomy, Honolulu, Hawai'i

1990: Research Assistant for Dr. George Herbig, University of Hawai'i Institute for Astronomy, Honolulu, Hawai'i

1988: Summer Research Associate, National Solar Observatories, Sacramento Peak Observatory, Sunspot, New Mexico

Professional Associations:

American Statistical Association (ASA)
American Astronomical Society (AAS)
Solar Physics Division (SPD) of the AAS
International Astronomical Union (IAU)
American Geophysical Union (AGU)
Sigma Xi Scientific Research Society

Scholarships and Awards:

Helen Jones Farrar Foundation Scholarship from the Achievement Rewards for College Scientists Foundation, 1991
Solar Physics Division of the AAS Studentship Award, 1990

Professional Community Service:

2023 – present: Member, National Academies' Committee on Solar and Space Physics

2021 – 2022: Member, National Academies' Committee on Space Weather Operations and Research Infrastructure Workshop: Phase II

2018 – present: *Solar Physics* (Springer) Advisory Board Member

2015 – 2018: Solar, Heliospheric and INterplanetary Environment (SHINE) Steering Committee

2015: National Aeronautics and Space Administration (NASA) Senior Review of Heliophysics Operating Missions

2013 – 2016: AAS/Solar Physics Division Prize Nominating Committee

2012 – 2013: Search Committee for the Director of the National Solar Observatories

2005 – 2011: Chair, User's Committee of the National Solar Observatories

2010 – 2011: Scientific Organizing Committee, "SDO-1, The Many Spectra of Solar Activity"

2010: Scientific Organizing Committee, "The Origin, Evolution, and Diagnosis of Solar Flare Magnetic Fields and Plasmas: Honoring the Contributions of Dick Canfield"

2008 –2009: Chair, AAS/SPD Nominating Committee

2006 – 2008: AAS/SPD Nominating Committee

2008: Local Organizing Committee, "The Second Hinode Science Meeting: Beyond Discovery – Toward Understanding"

2006 – 2008: Chair, CoRA Div/NWRA Space Committee

1998 – 2013: User's Committee of the National Solar Observatories

2000 – 2002: Elected, Council of the AAS/SPD

2000 – 2001: Science Definition Team, NASA Solar Dynamics Observatory Mission

1995 – present: Peer Referee for *The Astrophysical Journal* (25 papers), *The Astronomical Journal* (2), *Astronomy & Astrophysics* (5), *Solar Physics* (19), *JGR Space Physics* (2), *Space Weather Journal* (3), *Science* (2), *Nature* (3), *Advances in Space Research* (2), *Publications of the Astronomical Society of Japan* (2), *Journal of Space Weather and Space Climate* (4), *Journal of Plasma Physics* (1), *Monthly Notices of the Royal Astronomical Society* (1), *Publications of the Astronomical Society of the Pacific* (1), *Earth and Space Science* (1), *Earth, Planets and Space* (1).

1995 – present: Peer Reviewer for proposals to NASA, National Science Foundation (NSF), Air Force Office of Scientific Research (AFOSR), and foreign funding agencies

Students and Post-Doctoral Researchers Supervised or Mentored:

Mr. Yeongmin Kang (2022 -), PhD, Nagoya University: data-driven active region simulations

Mr. Jeoffrey Robinson (summar 2023) Florida Atlantic University (University of Colorado/Boulder Consortium Research Experience for Undergraduates (CU/REU): event precursor characterization

Dr. Karin Dissauer (2019 – 2021), NWRA (now Research Scientist)

Ms. Brianna Isola (summer/fall 2019), CU Stony Brook (University of Colorado/Boulder Consortium Research Experience for Undergraduates (CU/REU)): coronal energy storage

Ms. Alanna Sacra Cavins (summer 2019-spring 2020), Morehead State University (CU/REU): coronal energy storage

Dr. Benoit Tremblay (2018–2019), PhD, Université de Montréal: data assimilation and machine learning for solar plasma studies

Mr. Kento Nakatani (2018 – 2020), MS, Nagoya University: HMI data analysis and statistics for flare studies

Ms. Pei-Hsuan Lin (2018 – 2021), PhD, Nagoya University: HMI data analysis and statistics for eruptive flare studies

Ms. Sakurako Minoura (2017 – 2019), MS, Nagoya University: HMI and Hα data analysis for filament eruptions

Ms. Yuki Asahi (2017 – 2018), MS, Nagoya University: flare-related HMI data analysis

Dr. Sung-Hong Park (2017 –), Nagoya University: flare forecasting and data analysis (now tenured at ASI).

Dr. Tomoya Iju (2017), MS, Nagoya University: non-linear force-free extrapolations and interpretation

Ms. Alexandra Mannings (CU/REU summer 2016), University of Alabama: chromospheric pre-flare dynamics

Ms. Kate Lawrence (2016 – 2018), Fairview High School/MIT, Boulder, Colorado: chromospheric pre-flare dynamics

Dr. Yumi Bamba (2015 – 2017), Nagoya University/JAXA: flare trigger mechanisms

Dr. Stuart Gilchrist (2011 – 2013), University of Sydney: extrapolation algorithms

Dr. Moncef Derouich (2008 – 2010), Post-Doctoral Researcher, NWRA: inversion algorithms

Dr. Jin-Yi Lee (2008 – 2010), Post-Doctoral Researcher, NWRA: coronal heating

Dr. Kazunori Ishibashi (2007 – 2009), Post-Doctoral Researcher, NWRA: coronal heating

Dr. Ravindra Belur (2006 – 2008), Post-Doctoral Researcher, Montana State University: magnetic helicity

Dr. Evelyn Schumer (2005 – 2007), PhD, Air Force Institute of Technology: flare forecasting

Dr. Hannah Schunker (2005 – 2006), PhD, Monash University: sunspot structure

Dr. Lorraine Lundquist (2005 – 2007), PhD, University of California, Berkeley: coronal heating

Dr. Ashley Crouch (2006 – 2007), Post-Doctoral Researcher, NWRA: disambiguation algorithms

Dr. K. E. Rangarajan (2000 – 2001), Post-Doctoral Researcher, NWRA: data analysis methods

Ms. Tera Dunn, (2008 – 2009), Research Assistant, NWRA: flare forecasting

Mr. Jeffrey Tessein (CU/REU summer 2008) (University of New Hampshire, now at University of Delaware): flare forecasting

Ms. Jacinda Knoll (now Shelly) (CU/REU summer 2008) (now at Massachusetts Institute of Technology): flare forecasting

Ms. Ajeeta Khatiwada (CU/REU summer 2008) (Linfield College): algorithm validation

Mr. Peter Ashton (CU/REU summer 2007), (Boston University): algorithm validation

Ms. Rachel McDonald (CU/REU summer 2007) (University of Washington, now Yale University): active region structure

Invited Talks and Presentations (past 10 years):

Select talks can be found at `www.cora.nwra.com/~leka/Projects/RecentTalks.html`

Invited Seminar, "The Sun as an Experimental Laboratory", November 2023.

Invited talk, "Progress on the 'First Flare / Last Flare' Prediction Challenge", Korea-Japan Space Weather Workshop, Nagoya, Japan, October 2023.

Scene Setter (with Prof. Mike Wheatland), "The Structure and Evolution of Active Region Currents", SHINE Workshop 2023, Vermont, August 2023.

Invited talk, "Forecasting Solar Flares: Present Capabilities, Recent Advances, and 'Mind the Gaps!' ", Korean Astronomy and Space Sciences Institute, Daejeon, South Korea, June 2023.

Invited Talk, "Solar Flare Forecasting: The Statistical Challenges", 2021 Joint Statistical Meeting (virtual)

Invited Talk, "Realities, Challenges, and Innovation for Solar Flare Forecasting", The 4th PSTEP International Symposium (PSTEP-4) and the 2nd ISEE Symposium "Toward the Solar-Terrestrial Environmental Prediction as Science and Social Infrastructure", Nagoya, Japan, January 2020.

Invited Talk,"Realities, Challenges, and Innovation for Solar Flare Forecasting", American Geophysical Union, San Fransisco, December 2019.

Invited Science Seminar, "Estimating the Energy Storage and Release in the Solar Corona", Australian Bureau of Meteorology, Sydney, Australia, October 2019.

Invited Seminar, "Understanding and Forecasting the Solar Origins of Space Weather", Sydney Institute for Astrophysics, Sydney University, October 2019.

Invited Talk, "The Performance Characteristics of Operational Flare Forecasting Systems", at the US Space Weather Workshop, Boulder, April 2019.

Invited Talk, "Forecasting Solar Flares: Present Capability and Broad Implications for Solar Physics", at NOAA/Space Weather Prediction Center, April 2019.

Invited Talks, "Forecasting Solar Flares: Present Capability and Broad Implications for Solar Physics", at JAXA (Japan Space Agency), the Japan National Institute for Communication and Techology (NICT), and the National Astronomical Observatories of Japan, December 2018.

Invited Plenary Talk, "Understanding and Forecasting The Solar Origins of Space Weather", 2018 Triennial Earth-Sun Summit, Leesburg, VA, May 2018

Invited Talk, "The Magnetic Needs for Understanding (and Predicting) Solar Energetic Events", 2018 Committee on Space Research Meeting, Pasadena, CA, July 2018

Invited Seminar, "Solar Flares and Space Weather Forecasting", Institute for Space-Earth Environmental Research, Nagoya University, Japan, April 2017

Invited Talks, "Research toward determining available flare energies: Trying to answer "how big will it be?" and "Evaluating & Improving (Operational) Flare Forecasts: On-going and Upcoming Activities.", at the FLARECAST Science Workshop, L'Observatoire de Paris, Meudon, France, June 2017

Invited Talk, "Forecasting Solar Flares: Present Status, Recent Advances, and Continued Challenges", International Astronomical Union Symposium 335: 'Space Weather of the Heliosphere: Processes and Forecasts', Exeter University, Exeter, UK, July 2017

Invited Talk, "The Present State of Solar Flare Forecasting", First PSTEP International Symposium, Nagoya, Japan, January 2016

Invited Symposium, "Space Weather Forecasting and Solar Flares", Kyoto University, Japan, January 2016

Invited Talk, GOES VW: The Next Generation of Geosynchronous Space Weather Observations, "Present Status and Utility of Operational Solar Magnetic Field Observations in the context of NOAA-GOES V/W", Boulder, Colorado, April 2015

Invited Talk, European Space Weather Workshop 10: "Solar Flare Forecasting: A Critical Review", Antwerp, Belgium, November 2013

Invited Presentation, NCAR/HAO/NSO Synoptic Network Workshop, "Sweet Promises (and some Sour Realities) of Synoptic Full-Disk Vector Magnetogram Data", NCAR, Boulder, Colorado, April 2013

Community Engagement (past 10 years):

"The Great American Eclipse", public talk given 4 times Febraury – August 2017 in assorted venues.

Panelist, "Solar Week" on-line forum for science students (`www.solarweek.org/cms/`), 2002 – present

Judge, Boulder Valley Regional Science Fairs, 1998 – present

Judge, Elementary and Middle-School Science Fairs, Boulder Valley School District, 1998 – present

Mentor, Boulder Valley School District Science Research Seminar Program, 2012 – 2013

Funding Success as Principal Investigator:

2023, "Chicken & Egg, Again: The Early Chromospheric Dynamics of Solar Energetic Events", AFOSR, 4 years, $1,079,483, with Karin Dissauer, Eric Wagner.

2023, "NWRA tasks for Community Coordinated Modeling Center (CCMC)", NASA/CCMC, 2 years, $249,989, with Graham Barnes, Sara Petty, Eric Wagner.

2022, "Up, Up & Away! Relating Early CME Acceleration to Coronal Magnetic Topological Features.", NASA/Heliophysics Supporting Research, 3 years, $751,664, with Karin Dissauer, Graham Barnes, Eric Wagner.

2022, "A Bigger Library with Solid Bookends: Improving Solar Flare Prediction by Expanding Forecast Breadth and Addressing First/Last/Limb-Flare Challenges", NASA/R2O2R, 2 years, $476,549, with Eric Wagner, Lisa Upton, Kiran Jain.

2022, "NWRA contribution to A Capability for Community Modeling of Solar Eruption Propagation and Particle Radiation (SCEPTER)", NASA/Living With a Star: Strategic Capability (U. Michigan / S. Antiochos PI), 4 years, $398,528, with Graham Barnes.

2020, "NWRA support for Solar Storms and Terrestrial Impacts Center (SOLSTICE)", NASA/DRIVE Center Phase I (U. Michigan / T. Gambosi PI), 1 year, $63,799, with Graham Barnes.

2019, "D-Region Absorption Models and Associated Solar Drivers and Tools", AFRL, 2.25 years, $939,945, with LJ Nickisch, Graham Barnes, Sergey Fridman.

2019, "Improved Understanding of HMI Noise with Mitigation for Global Maps", NASA/GSFC, 2 years, $145,785.

2018, "Snap, Crackle,...Pop? Characterizing the Pre-Event Behavior of the Solar Corona", NASA/HGI, 3 years, $309,941, with Eric Wagner.

2018, "Finalizing The Mees CCD Hα Imaging Spectroscopy Rescue and Availability", NASA/HQ, 1 year, $60,507, with Eric Wagner and Kevin Reardon

2017 "Developing Vector Magnetic Maps from SDO/HMI that can Drive Space Weather Models", NASA/Living With A Star (subcontract with NASA/GSFC), 3 years, $309,412, with Graham Barnes, Eric Wagner

2017 "Consulting Services: DAFFS and Time-series Disambiguation for Solar-B FPP Phase E", Lockheed Martin Space Systems, on-going, $488,268, with Graham Barnes, Eric Wagner

2016 "Active Region Pre-History: Determining and Interpreting the Pre-Emergence Epoch", NASA/Heliophysics Supporting Research, 3 years, $585,786, with Graham Barnes, Doug Braun, R. T. James McAteer, Peter Schuck, Robert Stein, Eric Wagner

2016 "Data Services Upgrade: The Mees CCD Hα Imaging Spectroscopy Database", NASA/HIDEE, 2 years, $49,698, with Matt Penn, Shadia Habbal

2014 "Data Reduction and Inversion for the Imaging Vector Magnetograph Archive Database", NSF/AGS, 1 year, $30,899, with Eric Wagner

2014 "Delivering a Solar Flare Forecast Model that Improves Flare Forecast (Timing and Magnitude) Accuracy by 25%", NOAA/Small Business Innovative Research Program Phase II, 2 years, $399,995, with Graham Barnes, Eric Wagner

2014 " Forecasting of Solar Eruptions Using Statisical Mechanics, Ensemble, and Bayesian Forecasting Methods", AFRL/Small Business Innovative Research Program Phase I, 9 mo, $149,999, with Graham Barnes, Doug Braun, Eric Wagner

2013 "Delivering a Solar Flare Forecast Model that Improves Flare Forecast (Timing and Magnitude) Accuracy by 25%", NOAA/Small Business Innovative Research Program, 6 mo, $94,994, with Graham Barnes, Doug Braun

2012 "Photospheric properties of flaring vs. flare-quiet active regions: can we use HMI vector magnetogram sequences to quantify, 'when and why does the Sun go boom?' " NASA/GI, 3 years, $460,799, with Graham Barnes

2011 "Data Services Continuation: The Imaging Vector Magnetograph Resident Archive", NASA/HDEE, 4 years, $152,889, with Eric Wagner

2009 "Continuing in the Right Direction: Azimuthal Ambiguity Resolution for High-Cadence Vector-Magnetic Field Maps", NASA/GI, 4 years, $400,000, with Graham Barnes and Ashley Crouch

2009 "Stopping and Asking Directions: Exploiting div(B)=0 for Azimuthal Ambiguity Resolution", NASA/Supporting Research & Technology, 3 years, $446,953, with Graham Barnes and Ashley Crouch

2009 "Data Services Upgrade: Bringing the Imaging Vector Magnetograph Archive Data to the Heliophysics Community", NASA/VxO, 1 year, $49,511

2008 "Magnetic Charge Topology Analysis and SEP Event Prediction Using Discriminant Analysis", Wyle Laboratories (NASA/JSC), 1 year, $63,386, with Graham Barnes

2007 "Energetic Event Prediction by Discriminant Analysis" Wyle Laboratories (NASA/JSC), 1 year, $40,062, with Graham Barnes

2006 "Collaborative Research: Driving Solar MHD Simulations with Vector Magnetogram Sequences", NSF-SHINE; 3 years, $217,499, with Tom Metcalf

2005 "Can the Kink Instability Trigger Solar Energetic Events?", NSF-National Space Weather Program; 3 years, $275,231, with Graham Barnes

2004 "Resolving the 180° Azimuthal Ambiguity in Solar Vector Magnetic Field Measurements", NASA/LWS TR&T; 3 years, $389,000, with Graham Barnes and Tom Metcalf

2003 "Applying New Methods to Flare Prediction II: Realization of Methods for Photospheric Vector Magnetic Field Data and their Extension into the Chromosphere", AFOSR; 3 years, $468,000, with Graham Barnes and Tom Metcalf

2000 "Sunspot Evolution: The Photosphere's Changes and the Corona's Response", NASA/SRT; 2 years, $175,000

2000 "Applying New Methods to Flare Prediction Using Photospheric Vector Magnetic Field Data", AFOSR; 3 years, $336,000, with Dana Longcope

1998 "The Structure and Cause of Sunspot Penumbrae Investigated using High-Resolution Spectropolarimetry", NSF, 3 years, $252,000

Additional Collaborations:

2022, "To Be or Not to Be? Investigating the True Relationship between "Precursor" Phenomena, Mag netic Topology, and Solar Energetic Events", Karin Dissauer (P.I.), NSF

2022, "The Origin of the Photospheric Magnetic Field: Mapping Currents in the Chromosphere and Corona", Peter Schuck (P.I.), NASA/Living with a Star Science

2021 "Is it the Little Things? Investigating the True Relationship between "Precursor" Phenomena, Magnetic Topology, and Solar Flares", Karin Dissauer (P.I.), NASA/HGI 2021, "Faster, Better, Deeper: Utilizing Deep Learning to Produce Enhanced Near Real Time Inversions from HMI Data for Space-Weather Modeling", Graham Barnes (P.I.), NASA/LWSTM

2019 "Critical assessment of the 3D standard model of solar eruptions using a data-driven MHD approach", Stuart Gilchrist (P.I.), NSF

2019 "FINESSE: Forecasting the Ionosphere and Near-Earth Space Situational Environment", LJ Nickisch (P.I.), DARPA

2018 " Global boundary magnetic field optimization to improve solar wind model predictions", Graham Barnes (P.I.), NASA/HSW02R

2017, "Magnetic Skeletons, Solar Flares, and Space Weather", Dr. Michael Wheatland (P.I.), Australian Research Council

2016 "Estimating the Coronal Magnetic Field Energy Budget", Graham Barnes (P.I.), NASA/HSR

2016 "Pathways to Coronal Magnetic Energy Storage and Release", Graham Barnes (P.I.), NSF

2016 "The Role of the Lorentz Force in Solar Flares", Graham Barnes (P.I.), NASA/HGI

2015 "Disambiguation to Produce a New Temporally Consistent Series of SDO/HMI Vector Magnetogram Data", Graham Barnes (P.I.), NASA/GI

2015 "Monitoring Active Region Development on the Far-Side of the Sun", Charles Lindsey (P.I.), NOAA/SBIR Phase-I

2014 "Improving the Reliability of Solar Eruption Predictions to Contribute to the Determination of Targets-of-Opportunity for Instruments With a Limited Field-of-View", International Team in Space Sciences/ISSI, Paul A. Higgins and Manolis Georgoulis (chairs)

2012 "Using SDO/HMI data to investigate the energization of the coronal magnetic field", Graham Barnes (P.I.), NASA/TRT

2012 "Nonlinear Force-Free Modeling of the Solar Corona: Towards a New Generation of Methods", International Team in Space Sciences/ISSI, Marc DeRosa and Michael Wheatland (chairs)

2010 "Discriminating Helioseismic Signatures of Fast- and Slow-Mode Coupling in Magnetic Regions", Charles Lindsey (P.I.), NASA/GI

2009 "A Comparison of Flare Forecasting Methods", Graham Barnes (P.I.), NASA/TRT

2008 "Hinode Data for Nonlinear Force-Free Field Extrapolations", Graham Barnes (P.I.), LM-SAL

2007 "Predicting Active Region Emergence, Evolution, and Flare Productivity using Local Helioseismic Measurements and Discriminant Analysis", A. Birch (P.I.), NASA/TRT

2006 "Solar-B (Hinode) X-Ray Telescope Missions Operations and Data Analysis", (assumed P.I. position from Tom Metcalf's responsibility), Smithsonian Astrophysical Observatory/NASA

2006 "Predicting Flare Properties Using the Minimum Current Corona Model Energetic Events", Graham Barnes (P.I.) at NWRA/CoRA; funding from AFOSR

2005 "Porting and Maintenance of Existing Code to the HMI Pipeline", ambiguity-resolution module (assumed Tom Metcalf's responsibility), Doug. Braun (P.I.), Stanford/NASA

2005 "Distinguishing Reconnection Scenarios for Solar Energetic Events", Graham Barnes (P.I.), NSF/SHINE

2002 "The Emergence of Twisted Magnetic Flux into Pre-existing Coronal Structures", S. Gibson (P.I.) and Y. Fan (Co-I) at High Altitude Observatory/NCAR; AFOSR

2002 "Observations of the Magnetic Free Energy in Active Regions: The Energization of CMEs and Flares", Tom Metcalf (P.I.), NASA/LWS

Observing Experience:

Helioseismic and Magnetic Imager, Solar Dynamics Observatory (Co-Investigator and member, HMI Data Processing Pipeline Team)

Atmospheric Imaging Assembly, Solar Dynamics Observatory
Solar Optical Telescope/Spectropolarimeter and Hard X-ray Telescope, *Hinode*
Imaging Vector Magnetograph, University of Hawai'i, Mees Solar Observatory
Transition Region and Coronal Explorer
Michelson Doppler Imager and Extreme-UV Imaging Telescope, *SoHO*
The NSO/HAO Advanced Stokes Polarimeter and associated imaging systems, NSO/DST
Haleakalā Stokes Polarimeter (U. Hawai'i/MSO)
Soft Xray Telescope, White-Light Telescope, *Yohkoh*
MCCD Imaging Spectrograph, University of Hawai'i, Mees Solar Observatory

Additional Skills:

Programming in multiple languages and platforms, including `IDL`, `Unix/Linux`, `TeX/LaTeX`, `csh`/scripting, `LibreOffice`; some `Fortran, C`.

Conversant in French, basic Japanese and Rusian; some German.

Level-1 certificate, "Non-Adversarial Communications"

Other:

Award-winning chocolate chef
Wilderness First Responder with CPR/AED & Epinephrine Injection.
Bicycle/Trailer Maintenance Coordinator, Boulder Food Rescue (nonprofit)
City of Boulder Volunteer, "Skunk Canyon Weed Warriors"
Outside Stewardship Institute-trained Crew Leader for Ecological Restoration Projects, Noxious Weed Removal, and Native Seed Collection, Trails (4 separate certifications)
Certified Lead Cook, Wildlands Restoration Volunteers (nonprofit)

Publications:

Dr. K. D. Leka has been an author/co-author on over 80 refereed papers (journal articles and refereed proceedings), demonstrates an overall h-index of 36 / 41, an i-10 index of 57 / 61, with almost 3,000 unique citing papers. (sources: *Astrophysical Data System / Google Scholar*).

Refereed Journal Articles:

[1] Yeongmin Kang, Takefumi Kaneko, K. D. Leka, and Kanya Kusano. Data-driven MHD Simulation of the Formation of a Magnetic Flux Rope and an Inclined Solar Eruption. *Astrophys. J.*, 2023, submitted.

[2] David F. Fouhey, Richard E. L. Higgins, Spiro K. Antiochos, Graham Barnes, Marc L. DeRosa, J. Todd Hoeksema, K. D. Leka, Yang Liu, Peter W. Schuck, and Tamas I. Gombosi. Large-scale Spatial Cross-calibration of Hinode/SOT-SP and SDO/HMI. *Astrophys. J. Supp. Ser.*, 264(2):49, February 2023.

[3] KD Leka, Karin Dissauer, Graham Barnes, and Eric L. Wagner. Properties of Flare-Imminent versus Flare-Quiet Active Regions from the Chromosphere through the Corona II: NonParametric Discriminant Analysis Results from the NWRA Classification Infrastructure (NCI). *Astrophys. J.*, 942:84, January 2023.

[4] Karin Dissauer, KD Leka, and Eric L. Wagner. Properties of Flare-Imminent versus Flare-Quiet Active Regions from the Chromosphere through the Corona I: Introduction of the AIA Active Region Patches (AARPs). *Astrophys. J.*, 942:83, January 2023.

[5] K. D. Leka, Eric L. Wagner, Ana Belén Griñón-Marín, Véronique Bommier, and Richard E. L. Higgins. On Identifying and Mitigating Bias in Inferred Measurements for Solar Vector Magnetic-Field Data. *solphys*, 297(9):121, September 2022.

[6] Richard E. L. Higgins, David F. Fouhey, Spiro K. Antiochos, Graham Barnes, Mark C. M. Cheung, J. Todd Hoeksema, K. D. Leka, Yang Liu, Peter W. Schuck, and Tamas I. Gombosi. SynthIA: A Synthetic Inversion Approximation for the Stokes Vector Fusing SDO and Hinode into a Virtual Observatory. *Astrophys. J. Supp. Ser.*, 259(1):24, March 2022.

[7] Pei Hsuan Lin, Kanya Kusano, and K. D. Leka. Eruptivity in Solar Flares: The Challenges of Magnetic Flux Ropes. *apj*, 913(2):124, June 2021.

[8] Richard E. L. Higgins, David F. Fouhey, Dichang Zhang, Spiro K. Antiochos, Graham Barnes, J. Todd Hoeksema, K. D. Leka, Yang Liu, Peter W. Schuck, and Tamas I. Gombosi. Fast and Accurate Emulation of the SDO/HMI Stokes Inversion with Uncertainty Quantification. *apj*, 911(2):130, April 2021.

[9] Sung-Hong Park, K. D. Leka, and Kanya Kusano. Magnetic Helicity Flux across Solar Active Region Photospheres: II. Association of Hemispheric Sign Preference with Flaring Activity during Solar Cycle 24. *Astrophys. J.*, 911 press(2):79, April 2021.

[10] A. A. Pevtsov, Y. Liu, I. Virtanen, L. Bertello, K. Mursula, K. D. Leka, and A. L. H. Hughes. On a limitation of Zeeman polarimetry and imperfect instrumentation in representing solar magnetic fields with weaker polarization signal. *Journal of Space Weather and Space Climate*, 11:14, January 2021.

[11] Sung-Hong Park, K. D. Leka, and Kanya Kusano. Magnetic Helicity Flux across Solar Active Region Photospheres. I. Hemispheric Sign Preference in Solar Cycle 24. *Astrophys. J.*, 904(1):6, November 2020.

[12] S. A. Gilchrist, K. D. Leka, G. Barnes, M. L. DeRosa, and M. S. Wheatland. On Measuring Divergence for Magnetic Field Modeling. 900(2):136, Sept. 2020.

[13] Pei Hsuan Lin, Kanya Kusano, Daikou Shiota, Satoshi Inoue, K. D. Leka, and Yuta Mizuno. A New Parameter of the Photospheric Magnetic Field to Distinguish Eruptive-flare Producing Solar Active Regions. 894(1):20, May 2020.

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