

# AI in space

**Wisconsin Space  
Grant Consortium**

# **31st Annual Wisconsin Space Conference**

**Friday, Aug. 13, 2021**

# WSGC PRESENTATION SCHEDULE

Aug. 13, 2021

7:30–8:30 a.m.	<b>Registration and Breakfast</b>	Atrium
8:30 a.m.	<b>Welcome and Introductions</b> <b>Kevin Crosby:</b> WSGC Director; Physics; Professor; Carthage College <b>William Farrow:</b> Mechanical Engineering; Associate Professor; Milwaukee School of Engineering <b>Gwen Moore:</b> Congresswoman, Wisconsin's 4th Congressional District; Member, U.S. House of Representatives Committee on Science, Space and Technology <b>Eric Baumgartner:</b> Vice President of Academics; Milwaukee School of Engineering	Auditorium

## Session 1: Plenary Speaker Auditorium

8:45 a.m.	<b>Ashley Stroupe: Exploring Mars Through Robotic Eyes</b> Robotics Software Engineer specializing in Mars Rover Operations; Jet Propulsion Laboratory
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## Session 2: WSGC Partner Updates Auditorium

	<b>Moderator: Kevin Crosby:</b> WSGC Director; Physics; Professor; Carthage College	
9:30 a.m.	<b>Todd Treichel: Sierra Space:</b> <i>Sierra Space: Let's Make History!</i>	
9:45 a.m.	<b>Deb Houts: Zero Gravity Corporation:</b> <i>Hands-on Minds-On Apparent Weightlessness</i>	
10 a.m.	<b>Break</b>	Atrium

## Session 3A: Graduate Programs I Diercks Hall 110

	<b>Moderator: Lindsay McHenry:</b> UW-Milwaukee	
10:15 a.m.	<b>Logan Prust:</b> <i>Simulating Common Envelope Evolution on a Moving Mesh</i> ; Graduate and Professional Research Fellowship; Physics; UW-Milwaukee	
10:30 a.m.	<b>Anthony Taylor:</b> <i>The Evolution of the Ultraluminous Lyman-alpha Luminosity Function over <math>z=5.7-6.6</math></i> ; Graduate and Professional Research Fellowship; Astronomy; UW-Madison	
10:45 a.m.	<b>Nathan Colgan:</b> <i>Forced Convection Heat Rejection System for Mars Surface Applications</i> ; Graduate and Professional Research Fellowship; Nuclear Engineering and Engineering Physics; UW-Madison	
11 a.m.	<b>Bob Aloisi:</b> <i>TESS Follow Up Observations using Local Telescopes</i> ; Graduate and Professional Research Fellowship; Astronomy; UW-Madison	
11:15 a.m.	<b>Gabriel Freedman:</b> <i>Searches for Gravitational Waves from Supermassive Black Hole Binaries using Hamiltonian Monte Carlo</i> ; Graduate and Professional Research Fellowship; Physics; UW-Milwaukee	

## Session 3B: Faculty Programs I

Auditorium

**Moderator: Eric Barnes:** UW-La Crosse

- 10:15 a.m. **Andrea Henle:** *A New Website for Undergraduate Space Biology Education*; Higher Education Incentives; Biology; Carthage College
- 10:30 a.m. **Christina Othon:** *Examining Hydration Mechanisms of Osmolytes for Food Stabilization*; Research Infrastructure; Physics; Ripon College
- 10:45 a.m. **Relena Ribbons:** *Microbial communities in hydroponic gardens*; Research Infrastructure; Geosciences; Lawrence University
- 11 a.m. **Niti Mishra:** *Fine-scale characterization of vegetation phenology in a North American Prairie using Unmanned Aerial Systems (UAS) imagery*; Research Infrastructure; Geography and Earth Science; UW-La Crosse
- 11:15 a.m. **Melissa Vigil:** *COVID-19 remote learning development*; Higher Education Incentives; Physics; Marquette University

## Session 3C: Educator and Outreach I

Diercks Hall 129

**Moderator: Brian Ewenson:** Spaceport Sheboygan

- 10:15 a.m. **Meredith Alt:** *Wisconsin's Aviation Careers Education (ACE) Program Enhancements*; Special Initiatives; Wisconsin Department of Transportation
- 10:30 a.m. **Meredith Alt, Joan Kelnhofer:** *Women in Aviation International: Expanding Aviation Activities for Wisconsin Girls and Families*; Special Initiatives; Women in Aviation International–Four Lakes Chapter
- 10:45 a.m. **Todd Treichel:** *Rocket Science for Future Engineers*; Aerospace Outreach; AIAA–Wisconsin
- 11 a.m. **Tammy Moncel:** *Fish Eggs In Space*; Special Initiatives; Lac Courte Oreilles Ojibwe School

## Session 4: Posters and Networking

Balcony

**Moderator: Christopher Stockdale:** Marquette University

- Poster #1 **Jacob Edwards:** *Marquette Aerospace and Robotic Systems Lunar Mining Robot*; NASA Robotic Mining Competition Grant; Opus College of Engineering, Marquette University
- Poster #2 **Zachary Scheunemann:** *Aerodynamic dropsonde development*; Undergraduate Research; Physics; Carthage College
- Poster #3 **Henry Meyer:** *Monte Carlo RREA Modeling and Dosimetry*; Undergraduate Research Fellowship; Astronomy and Physics; Carthage College
- Poster #4 **Mary Ann Tuchscherer, Megan Kocher, Nicole Jackson:** *Women in Aviation International Conference 2020*; Women in Aviation Scholarship; Aviation and Aerospace; UW-Madison; UW-Milwaukee; MSOE
- Poster #5 **Calvert McCormick, Katie Cochran, Connor Plagge:** *Integrating Remote Sensing and GIS into Higher Level Geoscience Education*; Unmanned Aerial Vehicle Program; Geoscience; Carthage College
- Poster #6 **Chase Glenister:** *Paleoenvironmental reconstruction of glaciovolcanism in the Cascades of the Pacific Northwest: Implications of potential habitable environments on Mars*; WSGC Graduate and Professional Research Fellowship; Geoscience; UW-Milwaukee
- Poster #7 **Dalton Callow:** *Magneto-active Slosh Control*; Undergraduate Research; Physics; Carthage College

- Poster #8 **Sarah Kubiak:** *TESS follow up observations;* Astronomy; UW-Madison
- Poster #9 **Sarah Johns:** *Space is a Stressful Environment: How do Plants Communicate Stress?;* Graduate Fellowship; Botany; UW-Madison
- Poster #10 **Ariel Sorg:** *Signaling Dynamics of Abiotic Stress Adaptation in Arabidopsis;* Graduate Fellowship; Botany; UW-Madison
- Poster #11 **Annie Carani:** *Utilization of Legos in Distance Learning Introductory Physics Mechanics Labs;* Undergraduate Scholarship; Physics; Marquette University
- Poster #12 **Casey Rorabeck:** *Helicopter Emergency and Response Operations: Designing UAVs to Fight Wildfires;* NASA Internship; Engineering Physics; UW-Madison
- Poster #13 **Jason Martin:** *Enhanced corrosion characteristics of pulse plated galvanized steel substrates using simplified plating chemistry;* Research Infrastructure; Chemistry and Biochemistry, UW-La Crosse
- Poster #14 **Patrick Tarrant:** *Accessible SDSS Spectrographic Plug Plate Interactive Display;* Special Initiatives; Physics and Astronomy; Georgia State University
- Poster #15 **Bjorn Mortenson:** *Quantifying the Flooding Characteristics of Gas-Diffusion Layers for use in CO2 Electroreduction;* Research Infrastructure; Physics; UW-La Crosse
- Poster #16 **Evan Draxler:** *Surfactant enhanced electrodeposition of Manganese Dioxide for use in Rechargeable Alkaline Batteries;* Research Infrastructure; Chemistry and Biochemistry; UW-La Crosse
- Poster #17 **Riley Johnson:** *RockSat Microgravity Fluid Experiment;* Undergraduate Research; Physics; Carthage College
- Poster #18 **Lucas Bauer:** *Rainbow Plants: High Throughput Fluorescent Screening of Space Crop Genetic Modification Candidates;* Undergraduate Research; Botany; UW-Madison
- Poster #19 **Mason Williams:** *Vertical Angle Obstacle Avoidance for Wheeled Mobile Robots on Dynamic Environments;* Research Infrastructure Program, Mechanical Engineering, UW-Milwaukee
- Poster #20 **Patrick Selep:** *Virtual Stargazing;* Special Initiatives; Physics; UW-Milwaukee
- Poster #21 **Hannah Bechtel:** *The Effects of Radiation Pressure on Orbiting Mirrors with Non-Zero Eccentricity;* Undergraduate Research; Physics; UW-La Crosse
- Poster #22 **Alec DiGirolamo:** *Modal Propellant Gauging on the International Space Station;* Undergraduate Scholarship/NASA Internship; Physics/Astronomy; Carthage College
- Poster #23 **Cameron Fischer:** *Multi-point Measurement of Thunderstorm Electric Fields by Balloon-borne Dropsondes;* Undergraduate Research; Physics; Carthage College
- Poster #24 **Ian Murray:** *Automation of Hydration Dynamics Data Collection;* Undergraduate Research; Computer Science; Ripon College

## Cookout Lunch and Networking

Patio and Atrium

- 11:30 a.m.–12:45 p.m. **Individual Awardee Photos**
- 12:30 p.m. **Lunch**
- 1:30 p.m. **Group Photo**

## Session 5A: Undergraduate Programs I

Auditorium

	<b>Moderator: Swapnil Tripathi:</b> UW-Milwaukee at Washington County	
1:45 p.m.	<b>Nicholas Quisler:</b> <i>Exploring Quasars Through Their Broad Emission Line Shifts and Radio Morphology</i> ; Undergraduate Research; Physics and Astronomy; UW-Stevens Point	
2 p.m.	<b>Gage Siebert:</b> <i>Modeling the Optical System of NASA's EXCLAIM Mission</i> ; Undergraduate Research; Physics; UW-Madison	
2:15 p.m.	<b>Andrew Heinrich:</b> <i>Constraining black hole feedback in galaxy clusters from X-ray power spectra</i> ; Undergraduate Research; Astronomy; UW-Madison	
2:30 p.m.	<b>Tyler Scott, Elliot Marsh, Itai Bojdak-Yakes. Calvert McCormick:</b> <i>UAV-Acquired Imagery to Map Landslide Susceptibility along Lake Michigan</i> ; Undergraduate Research; Geoscience, Lawrence University	
2:45 p.m.	<b>Jacqueline Sporie:</b> <i>Synthesis and Characterization of a Zinc Oxide / Graphene Hybrid Nano Material</i> ; Undergraduate Research; Physics; UW-La Crosse	
3 p.m.	<b>Nicholas Schneider:</b> <i>Predicting the Flight Path of Large Stratospheric Balloons</i> ; NASA Internship; Observational Cosmology Lab; Goddard Space Flight Center	
3:15 p.m.	<b>Payton Jackson:</b> <i>Roman Space Telescope Thermal-Mechanical Projects</i> ; NASA Internship, Code 545, Thermal Branch; Goddard Space Flight Center	
3:30 p.m.	<b>Melanie Soloman:</b> <i>Test Engineering</i> ; Industry Internship; Aerospace Engineering; UW-Madison	
3:45 p.m.	<b>Break</b>	Atrium

## Session 5B: Faculty Programs II

Diercks Hall 110

	<b>Moderator: Robert Morrow:</b> Sierra Nevada Space	
1:45 p.m.	<b>Allison Murray:</b> <i>A Mixed Methods Study on the Transactional Distance of Engineering Students during COVID-19</i> ; Higher Education Initiatives; Mechanical Engineering; Marquette University	
2 p.m.	<b>Daniel Rust:</b> <i>Curriculum and Student Activities Based upon NASA Aerospace Initiatives</i> ; Higher Education Initiatives; School of Business and Economics; UW-Superior	
2:15 p.m.	<b>Eric Gansen:</b> <i>Mapping the Photoresponse of Quantum-Dot-Based Photon-Number-Resolving Detectors</i> ; Research Infrastructure; Physics; UW-La Crosse	
2:30 p.m.	<b>Kelly Gorres:</b> <i>Preventing Reactivation of Epstein-Barr Virus in Astronauts</i> ; Research Infrastructure; Chemistry and Biochemistry; UW-La Crosse	
2:45 p.m.	<b>Brian Slaboch:</b> <i>Reconfigurable Space Mechanisms for Mission Critical Applications</i> ; Research Infrastructure, Higher Education Initiatives; Mechanical Engineering; MSOE	
3 p.m.	<b>Lorena Rios Mendoza:</b> <i>Microplastics Everywhere</i> ; Research Infrastructure; Natural Sciences; UW-Superior	
3:15 p.m.	<b>Lindsay McHenry:</b> <i>Planetary Science in the Virtual Classroom</i> ; Research Infrastructure, Higher Education Initiatives; Geosciences; UW-Milwaukee	
3:30 p.m.	<b>Jie Gao:</b> <i>Beyond 5G: The Integration of Satellite and Terrestrial Networks</i> ; Research Infrastructure: Early Stage Investigator; Electrical and Computer Engineering, Marquette University	
3:45 p.m.	<b>Break</b>	Atrium

## Session 5C: Graduate Programs II

Diercks Hall 129

**Moderator: Beth Johnson:** UW-Oshkosh, Fox Cities Campus

- 1:45 p.m. **Scott Lucchini:** *The Magellanic Corona: A Case Study in Properties of the Circumgalactic Medium*; Graduate and Professional Research Fellowship; Physics; UW-Madison
- 2 p.m. **Brandon Piotrkowski:** *Multi-messenger events and how to find them*; Graduate and Professional Research Fellowship; Center for Gravitation, Cosmology; UW-Milwaukee
- 2:15 p.m. **Muhammad Haider, Nathan Salowitz:** *Explorations of Post Constrained Recovery Residual Stress of Shape Memory Alloys Self-healing Applications*; Graduate and Professional Research Fellowship; Mechanical Engineering; UW-Milwaukee
- 2:30 p.m. **Trevor Oxholm:** *The Experiment for Cryogenic Large-aperture Intensity Mapping (EXCLAIM!)*; Graduate and Professional Research Fellowship; Physics; UW-Madison
- 2:45 p.m. **Jason Carman:** *Comparing surface and subsurface paleolake deposits of Tecopa, California*; Research Infrastructure; Geosciences; UW-Milwaukee
- 3 p.m. **Daniel Rybarczyk:** *The atomic-to-molecular transition in the diffuse ISM: observations and simulations*; Graduate and Professional Research Fellowship; Astronomy; UW-Madison
- 3:15 p.m. **Ivan Rulik:** *Cooperative Control of Mobile Robot Manipulators*; Research Infrastructure, Mechanical Engineering, UW-Milwaukee
- 3:45 p.m. **Break** Atrium

## Session 6A: Educator and Outreach II

Diercks Hall 110

**Moderator: Todd Treichel:** Sierra Nevada Space

- 4 p.m. **Barbara Bielec:** *STEM Inspiration–BTC Institute Outreach to Children and Teachers*; Aerospace Outreach and Special Initiatives, BTC Institute
- 4:15 p.m. **James Senft:** *Next Generation of Aviators*; Aerospace Outreach; Aviation
- 4:30 p.m. **Coggin Heeringa:** *Light Years at a Social Distance*; Aerospace Outreach; Crossroads at Big Creek
- 4:45 p.m. **Break** Atrium

## Session 6B: Undergraduate Programs II

Auditorium

**Moderator: Brian Welch:** UW–Green Bay

- 4 p.m. **Alana King, Amanda Strebe, Amosia Agee-Hill, Liam Carls:** *Carthage Space Sciences: Flight Projects #1*; Undergraduate Research; Physics & Astronomy; Carthage College
- 4:15 p.m. **Bennett Bartel, Nicolas Welker, Mary Travis, Dalton Callow:** *Carthage Space Sciences: Flight Projects #2*; Undergraduate Research; Physics & Astronomy; Carthage College
- 4:30 p.m. **Meagan Carney:** *Precision Cleaning Process Development*; Undergraduate Scholarship; Industrial and Systems Engineering; UW-Madison
- 4:45 p.m. **Break** Atrium

## Session 7: Team Programs: Student Satellite and NASA Competition

Auditorium

**Moderator: William Farrow:** Milwaukee School of Engineering

- 5 p.m. **Narisse King, Rebecca Alibio:** *Investigating the Ionosphere During an Eclipse*; 2020 Elijah High-Altitude Balloon; Elijah Payload Team
- 5:15 p.m. **Julia Kalish, Jorge Gutierrez, Bryana Salazar, Jordan Cioni:** *2021 WSGC Elijah High Altitude Balloon Payload Team*; 2021 Elijah High-Altitude Balloon; Elijah Payload Team
- 5:30 p.m. **Patrick Naumann, James Foley:** *Rapid Prototyping and Sensor Modularity for the 2021 Collegiate Rocket Competition*; 2021 Intercollegiate Rocket Launch; Marquette University
- 5:45 p.m. **Benjamin Van Oss, Brian Lee, Erin Kammann:** *CRL: Pioneer Rocketry*; 2021 Collegiate Rocket Launch, UW-Platteville
- 6 p.m. **Dylan Schmidt:** *CRL 1st place: Wombat Wocketry*; 2021 Intercollegiate Rocket Launch; UW-Green Bay, Sheboygan Campus
- 6:15 p.m. **Katie Rabidoux:** *2021 Spaceport America Cup*; 2021 Spaceport America Cup; UW-Platteville

## Closing Remarks

Auditorium

- 6:30 p.m. **Thank You and Farewell: Kevin Crosby**

# PLENARY SPEAKER

## EXPLORING MARS THROUGH ROBOTIC EYES



### Ashley W. Stroupe, Ph.D.

**JPL | Systems Engineer, 397B - Planning and Sequencing Systems  
MSL Rover Planner Team Lead, Tactical Uplink Lead Deputy Team Lead,  
Supra-Tactical Lead Team Member**

Dr. Ashley W. Stroupe is a systems engineer at Jet Propulsion Laboratory (JPL) in Pasadena, California. She specializes in Mars Rover operations. She has performed many different roles over the last 16 years for the Curiosity, Opportunity and Spirit rovers.

Presently, Stroupe's primary role is the team lead for the Curiosity Rover Planners, the team that drives and controls the robotic arm. She also works as a tactical uplink lead, managing the daily planning process for the rover, and as a supra-tactical lead, sketching out and modeling the activities for near-term plans. In addition to her flight work, Stroupe has conducted research focusing on cooperative multi-robot teams in complex environments with applications to exploration and mapping, cooperative manipulation and sampling.

Stroupe received a B.S. in Physics/Astronomy from Harvey Mudd College in 1990, an M.S. in Electrical Engineering from George Mason University in 1998, an M.S. in Robotics from Carnegie Mellon University in 2001, and a Ph.D. in Robotics from Carnegie Mellon University in 2003. She joined JPL in 2003.



# 2021-2022 Calendar of Opportunities

[spacegrant.carthage.edu](http://spacegrant.carthage.edu)

## STUDENT PROGRAMS

### Undergraduate Scholarship (UGS)

*Two-year Academic Institutions*

### STEM Bridge Scholarship (SBS)

### Women in Aviation Scholarship (WAI)

Application Deadline: Oct. 4, 2021

### Undergraduate Scholarship (UGS)

### Undergraduate Research (UGR)

Application Deadline: March 7, 2022

### Dr. Laurel Salton Clark Memorial

### Graduate & Professional Fellowship (LSC)

### WSGC Graduate & Professional

### Research Fellowship (GPP)

Application Deadline: March 14, 2022

## TEAM PROGRAMS

### Collegiate Rocket Launch (CRL)

### First Nations Launch (FNL)

Application Deadline: Oct. 22, 2021

### Midwest Rocket Launch (MRL)

*WSGC Notice of Intent (NOI) to compete*

Application Deadline: TBD

### Elijah High-Altitude Balloon Program (EBP)

### Unmanned Aerial Vehicle Program

Application Deadline: Feb. 14, 2022

## FACULTY, INDUSTRY & OUTREACH PROGRAMS

### Embedded Teacher Program (ETP)

Application Deadline: Sept. 3, 2021

### Aerospace Outreach Program (AOP)

### Special Initiatives Program (SIP)

Application Deadline: Oct. 8, 2021

### Industry Internship Program (IIP)

Application Deadline: Nov. 5, 2021

### NASA Sponsored Competitions

Fall Application Deadline: Nov. 12, 2021

Spring Application Deadline: Feb. 4, 2022

### Higher Education Incentives (HEI)

### Early-Stage Investigator (ESI)

### Research Infrastructure Program (RIP)

Application Deadline: Dec. 10, 2021

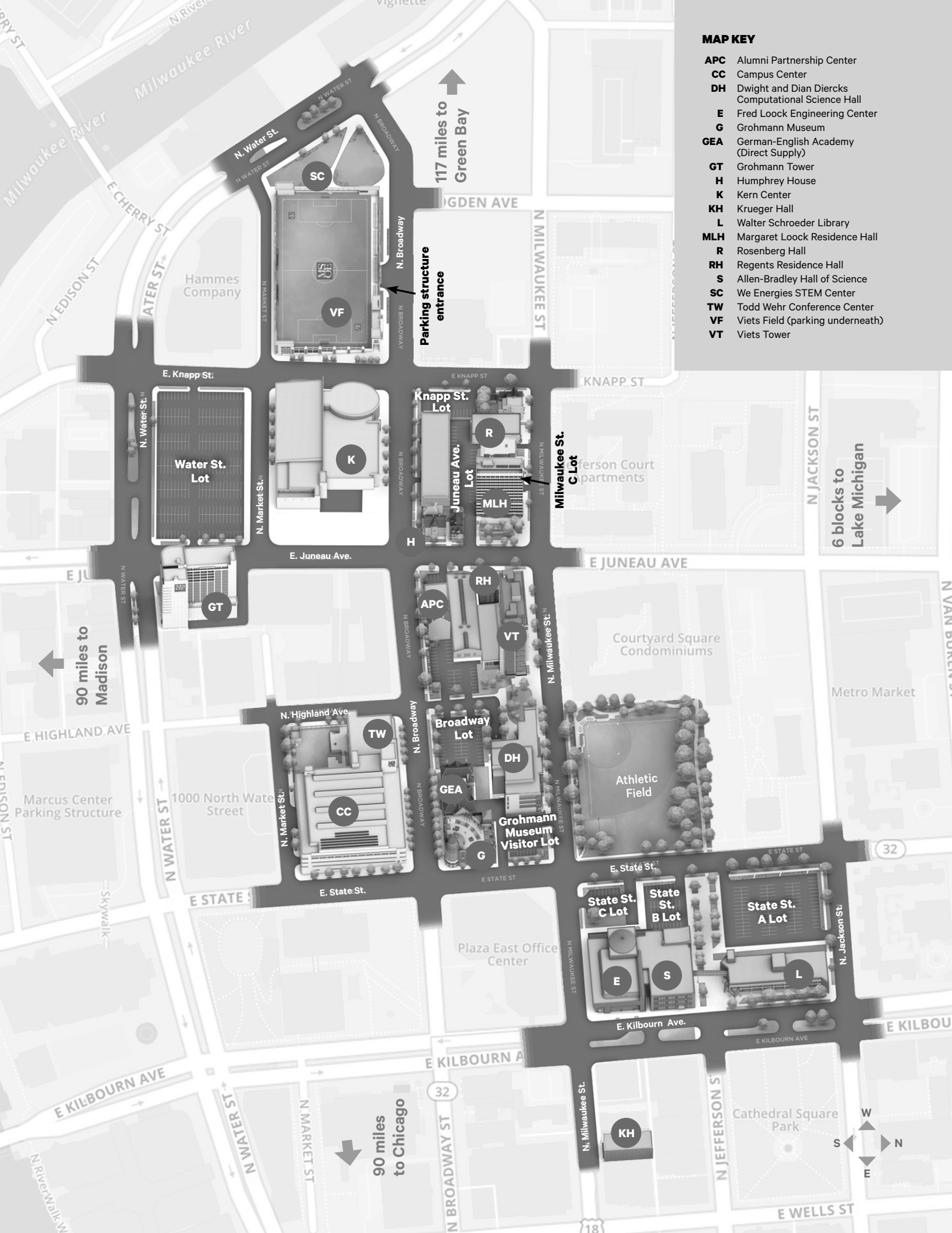
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**MAP KEY**

- APC** Alumni Partnership Center
- CC** Campus Center
- DH** Dwight and Dian Diercks Computational Science Hall
- E** Fred Look Engineering Center
- G** Grohmann Museum
- GEA** German-English Academy (Direct Supply)
- GT** Grohmann Tower
- H** Humphrey House
- K** Kern Center
- KH** Krueger Hall
- L** Walter Schroeder Library
- MLH** Margaret Looch Residence Hall
- R** Rosenberg Hall
- RH** Regents Residence Hall
- S** Allen-Bradley Hall of Science
- SC** We Energies STEM Center
- TW** Todd Wehr Conference Center
- VF** Viets Field (parking underneath)
- VT** Viets Tower



117 miles to Green Bay

Parking structure entrance

6 blocks to Lake Michigan

90 miles to Madison

90 miles to Chicago



