

SOLAR EXPRESS

WINTER PROGRESS - 1999

IN THIS ISSUE:

MEET THE RACE
CREW LEADERS
PAGE 1 & 2

MEET THE REST
OF RACE CREW
PAGE 2 & 3

MECHANICAL
TEAM REPORT
PAGE 3

POWER!LAB /
ARRAY TEAM
UPDATE
PAGE 4

TEST CHASSIS
PICTURES
PAGE 5

BUY-A-CELL
FORM
PAGE 6

SPONSOR
SPOTLIGHTS
PAGE 5 & 7

SPONSOR PAGE
PAGE 8 & 9

BUY-A-CELL/
WESTERN
QUALIFIERS
- BACK COVER

Meet the Race Crew Leaders

by Jed Christiansen, Race Manager (Photographs by Jose Alvarez)

Since our last newsletter was published, the University of Michigan Solar Car Team has chosen its Race Crew and Race Crew Leaders for Sunrayce 99. The Race Crew leadership was chosen by a nomination process, where candidates were reviewed by a committee of past team members and our Faculty Advisor, Dean Gene Smith. This committee recommended a "slate" of people to lead the team in our final months, which was then approved by the Solar Car Team as a whole.

As Race Crew Leaders, the five of us then chose the rest of Race Crew. It was a very difficult challenge, since we had a large

quantity of quality applicants. We debated for many hours until we decided on the Race Crew members that you see in this issue.

I want to thank the committee that chose the Race Crew leadership for their help and dedication. They spent many hours listening to the candidates speak at a team meeting, reading applications, and discussing their recommendations. They were (in order of former team): Susan Fancy from *Sunrunner*, Jeff Zoltowski from *Maize&Blue*, Aaron Bragman and Andrew Schrauben from both *Solar Vision* and *Wolverine*, Steve Stewart from *Wolverine*, as well as Dean Gene Smith.

Race Manager

Jed Christiansen

The Race Manager is the Race Crew leader. He is responsible for the team's performance before, during, and after Sunrayce '99 and World Solar Challenge '99. Some of the areas he focuses on are: team dynamics, scheduling, budgets, and public relations. Jed has been the Solar Car Team's Project Manager since August 1997.

Age: 21
Major: Aerospace
Engineering
Year: Senior
Hometown:
Eagan, Minnesota
Team Member
Since: 1995



Crew Chief

Dave Jordan

The Crew Chief is in charge of coordinating the efforts of all the race engineers to prepare *MaizeBlaze* for each race day. He also keeps track of the car's progress during the day with the help of the Strategy Team. He is also responsible for being prepared for any roadside repairs. Dave will be implementing a checklist system to make sure that no details are missed during the preparation and racing of the vehicle.

Age: 19
Major: Engineering
Physics
Year: Sophomore
Hometown:
Parma, Ohio
Team Member
Since: 1997



Meet the Race Crew Leaders

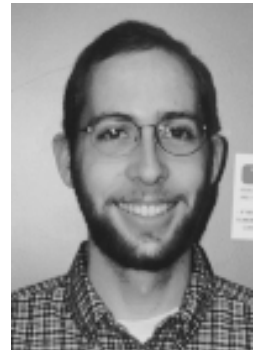
(continued from Page 1)

Vehicle Coordinator

Reuben Rohrschneider

The Vehicle Coordinator has the most knowledge about the vehicle as a whole and is responsible for the well being of the vehicle before and on the race. He coordinates tasks that are vehicle specific and performs any necessary road-side repairs with the other appropriate engineers. Routine maintenance is also an important part of his tasks along with decisions about vehicle integrity and safety. In summary this job requires knowing everything possible about the race vehicle.

Age: 22
Major: Aerospace Engineering
Year: Senior
Hometown: Mercer Island, Washington
Team Member Since: 1995



Head Strategist

Russ Moerland

The Head Strategist's primary responsibility is to determine the optimal racing strategy to increase the probability of winning the race. This is often done using computational models, though intimate knowledge of the vehicle, race route and the weather prove usefull when the computer is in error. In addition to this the Head Strategist is responsible for coordinating the efforts of the short-term strategist and the weather forecasters.

Age: 21
Major: Aerospace Engineering
Year: Senior
Hometown: Jenison, Michigan
Team Member Since: 1996



Operations Leader

Nader Shwayhat

The Operations Leader main reponsibilities include heading up all team logistics, public relations, financial, and daily operations for the *MaizeBlaze* Team before, during and after the race. To help with all of these areas the "Ops" Team has five members that are assigned an area to work on in preparation for our races. Some of these areas include the webpage, this newsletter, and the Buy-A-Cell campaign.

Age: 20
Major: Mechanical Engineering
Year: Junior
Hometown: Troy, Michigan
Team Member Since: 1996

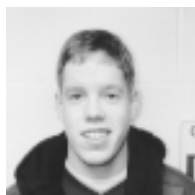


Strategy Team

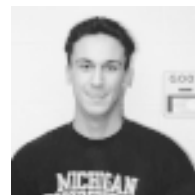
Drivers



Daniel Stern



Darrell Patterson



Jason Kramb



Vikram Sahney

SOLAR EXPRESS

WINTER PROGRESS 1999

EDITOR:
 JOSÉ ALVAREZ

ASSISTANT EDITOR:
 HEATHER NETTLE

TEAM OFFICE:

THE U OF M SOLAR CAR TEAM
 3411 EECS
 1301 BEAL
 ANN ARBOR, MI
 48109-2116

PHONE:
 (734) 764-2257

FAX:
 (734) 647-4746

WEBSITE:
 WWW.ENGIN.UMICH.EDU/
 SOLARCAR

Engineering Team



Heather Nettle



Michelle Strehle



Joe Lambert



Jim DeBoer

Operations Team



Jose Alvarez



Chris Schooley



Patrick Hunt



Sean Kennedy

Mechanical Team Update

by Chris Ancona, Mechanical Team

Over the past few months the mechanical team has recovered from numerous setbacks to achieve formidable success. We began testing after we repaired the team's test track from damage incurred from previous years. During testing, we overcame problems with our structural adhesive. We crashed the test chassis and, thankfully, only damaged the chassis. After extensive repairs were completed, a snowstorm made testing on our test track impossible. DaimlerChrysler then came to our rescue by allowing us to run at their facilities at the Chelsea Proving Grounds. In the meantime, Farmer Underwood sponsored the team by plowing the track. The University of Michigan grounds crew then salted the track to melt any leftover ice. The Athletic Department allowed the team to use Michigan Stadium to add miles to the car when the Chelsea Proving Grounds were not available.

You may ask why I said earlier that we have achieved formidable success. Well, because not one person on the team complained or gave up in the face of the setbacks. The whole team simply confronted the problems, devised solutions, and put them to work quickly. Teamwork has been excellent! Secondly, we have put over 500 miles on the test chassis. The testing that was done was sufficient enough to show us where improvements could be made and verified that the designs and calculations that we have done are acceptable.

Throughout these trials we have grown as a team, as individuals, and have learned to trust in our vehicle and teammates. Put all of this together and it is easy to see that this is a team that is on its way to victory.

Editors Note: The last edition (November/December) of Solar Express will have reached many of you in mid-February, this delay was due partially to the winter break and problems with transferring the newsletter to Printing Services for publication. Therefore we have made this issue of Solar Express larger to not only include pictures of the entire race crew in Solar Express, but also to help catch you up on all of our recent accomplishments. Solar Express will again be printed in its usual monthly basis from now on. Thank you very much for your support of our team. - Jose Alvarez

FOR
MORE
INFO:

ON THE TEAM:

JED CHRISTIANSEN
(734) 764-2257

ON THE RACE:

BRYAN ARNOLD
SUNRAYCE HQ
(800) 606-8881

ON THE UNIVERSITY
OF MICHIGAN:

DEAN GENE SMITH
(734) 647-7106

ON HOW TO
BECOME A
SPONSOR:

NADER SHWAYHAT
(734) 764-2257

ON THE WEBPAGE:

SEAN KENNEDY
(734) 764-2257

FOR PRESS
INFORMATION:

JOSÉ ALVAREZ
(734) 764-2257

The Story of the Power!Lab

by Heather Nettle, Array Team Leader

One of the biggest projects for the *MaizeBlaze* team was the construction of a cleanroom over the summer. UM Housing Division sponsored a work space for the electrical team within their storage warehouse. However, building a solar array requires a dust-free space, which this warehouse is not. This condition led to the decision to build a room within the warehouse, which UM Housing was kind enough to approve. To create a dust-free space, this room is sealed with the exception of a filtrated ventilation system that creates positive pressure. Our cleanroom is actually three rooms. One is used for testing batteries. It contains an

environmental chamber designed to test the batteries at various temperatures and humidities. The second room is used for testing solar cells, soldering solar cells and other electrical work. The third and largest room is sealed from the other two and contains a separate filtration unit. This room is specifically designed for attaching the solar cells to the surface of the car and encapsulating the cells, a sometimes toxic process. To ensure our safety, the room has one fresh air change per minute and also contains a supplied air system. In addition, it has overhead lamps that simulate sunlight for testing the full array in a controlled environment.



(Right) Eric Beaser (far right), Chris Deline are preparing to unpack the solar cells received from Spectrolab. The cells will be kept in groups depending on their voltage and current characteristics. Steve Chen is cleaning the floor of the Power!Lab before the rest of the cells arrive. (Photo by Jose Alvarez)



(Left) Michelle Strehle (top) and Chris Deline practicing their tabbing and soldering skills before the manufacture of MaizeBlaze's array starts. (Photo by Jose Alvarez)



(Left) Some of the equipment being used in the Power!Lab: the HP Power Supply (top), three Keithley benchtop multimeters and a Keithley sourcemeter. (Photo by Jose Alvarez)

Array Team Update

by Heather Nettle, Array Team Leader

The array team's other major project has been the construction of a solar cell characterization system. The system can be used to test each individual cell and determine its IV curve. This allows us to electrically characterize each cell and determine its appropriate place on the car. However, our solar cell characterization system is still under construction; due to the quickly approaching race, it has been put on hold until after Sunrayce '99. Without our system completed, it was still necessary to test our solar cells, a process sponsored by Spectrolab (see the Sponsor Spotlight). We are hoping to have the tester completed over the summer by teammates not attending Sunrayce 99, allowing us to use the system for future races.

Throughout the previous summer and fall, we have been honing our skills at soldering. Soldering solar cells is a very delicate process that is integral to the array performance. We now have many teammates skilled at this process and ready to begin work. Our cells were cut by Sunwize Technologies in December and were shipped to Spectrolab for testing. The solar cells arrived February 5, and we can finally begin construction of the array. We have less than three months until the array is scheduled for completion, so if you don't hear from students on the array team, we are hard at work in the cleanroom!

Test Chassis Pictures



(Left) Vik Sahney driving the MaizeBlaze test chassis around Michigan Stadium. (Photo by Daniel Stern)

SPONSOR SPOTLIGHT:

Ciba

by Ryan Smith, Materials and Manufacturing Team Leader

The Performance Polymer division of Ciba Specialty Chemicals is a new sponsor for the MaizeBlaze project. Their advanced adhesives, tooling, and polymers have allowed the team to design many intricate and detailed parts. For example, Ciba's REN SHAPE™ 460 epoxy modeling board will continue to be used for such applications as polyurethane injection molds and wind tunnel models. In the near future, electronic enclosures and mechanical component guards will be custom fabricated in these molds using several Part's in Minutes™ polyurethanes. However, Ciba's involvement is not limited to small components. MaizeBlaze's race chassis mold is machined out of Polyboard™ 222, a glass-filled polyurethane modeling board chosen for its excellent edge definition and durability. When completed, the chassis will be bonded to the body using application specific adhesives and procedures.

As the *MaizeBlaze* team gears up to finish the vehicle, Ciba Specialty Chemicals is playing an ever increasing role in ensuring that the best materials are used for each specific application and that the vehicle is the lightest and strongest that it can be. The MaizeBlaze team sincerely appreciates the efforts of Jeff Cross and Kurt Frischmann of Ciba Specialty Chemicals and looks forward to updating you on the efforts of Ciba in the coming months.



UNIVERSITY OF MICHIGAN SOLAR CAR TEAM

Ten Years Under the Sun

Buy-A-Cell Program

The University of Michigan Solar Car Team is celebrating ten years of successful racing with our fifth-generation car, *MaizeBlaze*. We will be competing in Sunrayce '99 across the East Coast in June 1999 and World Solar Challenge '99 across the Australian Outback in October of 1999.



To make a run for what could be our third national championship, we need your help! By "Buying" a Solar Cell for *MaizeBlaze's* solar array, you will be directly contributing to the success of our team. Your contribution also signifies your commitment to education and environmental objectives.

We hope that you will Buy-A-Cell and join the winning Michigan Solar Car Team tradition!

BENEFITS OF THE BUY-A-CELL PROGRAM

- CERTIFICATE WITH A MAP OF THE PLACEMENT OF YOUR SOLAR CELL ON *MAIZEBLAZE*
- SUBSCRIPTION TO SOLAR EXPRESS, THE SOLAR CAR TEAM NEWSLETTER
- RECOGNITION ON THE TEAM'S SUPPORT TRAILERS

We are also offering a special student's Buy-A-Cell package for \$25. Please call the Solar Car Team Office for more details.

UNIVERSITY OF MICHIGAN
SOLAR CAR TEAM

3411 EECS
1301 Beal Avenue
Ann Arbor, Michigan
48109

Phone:
734-764-2257
Fax:
734-647-4746
Email:
maizeblaze@umich.edu

<http://www.engin.umich.edu/solarcar>

Name

Address

Phone

Signature

| | Qty. | Price |
|-------------------|------|-------|
| Solar Cell | | \$100 |

Total: _____

Payment by check only please.

SPONSOR SPOTLIGHT:

MSX International

by Jason Kramb, Aero/Body Team Leader

This month we would like to recognize the support and assistance that MSX International has provided the University of Michigan Solar Car Team. With many hours spent in the wind tunnel and running computational fluid dynamics (CFD) simulations to perfect the aerodynamic shape of *MaizeBlaze*, MSX International agreed to build the molds required to accurately layup the body of the final race car. These molds allowed us to go directly from a 3D computer model to a final body shape with the accuracy of computer controlled machining. MSX International also agreed to construct the mold for the chassis of the car. With these molds, every composite part made for the race vehicle will have been made on a mold constructed by MSX International.

MSX International is a multinational corporation that offers a complete range of services at any point in the development cycle of vehicles or other durable products. They also fulfill needs such as training, purchasing management, marketing and distribution services, and document imaging and management to customers around the world.

With teamwork and dedicated sponsors such as MSX International, the construction of a national championship winning vehicle is easily within our team's reach.



Aero/Body Team leader Jason Kramb working on a section of the mold made for the team by MSX International.

SPONSOR SPOTLIGHT:

Spectrolab

by Heather Nettle, Array Team Leader

Spectrolab, Inc., a division of the Hughes Electronics Corporation, is one of the new additions to our sponsor list. Spectrolab is a leading supplier of solar cells, solar simulators, solar panels and searchlights. Spectrolab was founded in 1956 and, in 1958, manufactured the body-mounted solar panels on Pioneer 1. They then went on to manufacture the solar array for Explorer 6, the first satellite to use a solar array rather than body-mounted panels.

Spectrolab helped our team by testing our solar cells. Solar cells must be tested so that they can be divided into groups with similar electrical properties. This allows us to combine the cells in such a way to maximize the power output from the array. Spectrolab has been a great help in offering us this service to increase our chances of winning Sunrayce!



Left: Chris Deline is soldering cells cut by Spectrolab before they become the part of the array.

IN THE NEXT SOLAR EXPRESS

- BODY CONSTRUCTION BEGINS
- RACE CREW GETS IN SHAPE
- SPONSOR SPOTLIGHT : ALTAIR AND MDSI

MAIZEBLAZE

PLATINUM LEVEL



GOLD LEVEL



from NAVISTAR



INTERNATIONAL



SPONSORS

SILVER LEVEL

DUPONT
HEWLETT PACKARD
LEAR CORPORATION
LOCKHEED MARTIN
MACK INDUSTRIES

MICROSOFT
NTN CORPORATION
S.P.S. TECHNOLOGIES
SPECTROLAB
UM COLLEGE
OF ENGINEERING

BRONZE LEVEL

ALLIED SIGNAL
ARCH COMMUNICATIONS
BADGER FIRE PROTECTION
EATON CORPORATION
ELDERFIELD & HALL, INC.
GE PLASTICS
HERMAN-MILLER
MATHWORKS

MERITOR
MICHELIN-
NORTH AMERICA
NATIONAL INSTRUMENTS
NORTHWEST AIRLINES
OFFICE OF THE
VICE-PRESIDENT OF
STUDENT AFFAIRS

OFFICE OF THE
VICE-PRESIDENT
OF RESEARCH
PLASCORE INC.
S-3 ENGINEERING INC.
TEKTRONIX
WAHL INSTRUMENTS, INC.

CREW LEVEL

ADWESTBOWDEN
AIRTECH INTERNATIONAL
ALBIN BUSINESS CENTER
AMERICAN ALLSAFE, Co.
ANN ARBOR WELDING SUPPLY
ANSUL INC.
AP RACING
BOISE-CASCADE
BOULTON H.L., Co., Inc.
BREASCO
BREWER'S NORTH CAMPUS BP
BREED TECHNOLOGIES, INC.
BUTKI CARBIDE & TOOL
COPPOS FILMS
DANIEL STERN LIGHTING Co.
DE-COMP COMPOSITES

DIGI-KEY
E. JORDAN BROOKS
ECO PHYSICS, INC.
ENCON SAFETY PRODUCTS
FARMER & UNDERWOOD
FORSYTHE MIDDLE SCHOOL
HEXCEL
HI-LEX
JACK AND MAE SWEAZY
JOHN BARD TOOL Co.
JOHN S. BARNES CORP.
LA-MAN CORP. - FILTER DIVISION
THE LEXINGTON COMPANY
MATARAH INDUSTRIES
METTLER-TOLEDO
NEWARK ELECTRONICS
OHAUS

OMEGA ENGINEERING
PREVENTIVE CARE, INC.
PRINCE CORP.
R.D.C. NETWORKS INC.
RASPBERRY HILL PUBLISHING, INC.
SAFETY SERVICES, INC.
SHOP-VAC
SINGER SAFETY COMPANY
SMITH EQUIPMENT
SPEAR'S FIRE AND SAFETY
SQUARE D
TAP MAGIC
UM CENTER FOR
PROFESSIONAL DEVELOPMENT
UM CREDIT UNION
UM HOUSING DIVISION
UM OSEH



2

UNIVERSITY OF MICHIGAN
SOLAR CAR TEAM
3411 EECS, 1301 BEAL AVENUE
ANN ARBOR, MI 48109-2116

Thank you Buy-A-Cell Sponsors

JOSE JOSE ALVEREZ
KAYUEN CHANG (5)
MARILYN CHRISTIANSEN
CHARITY MACHINING
MARGARET FISHER
HEARTWELL MORTGAGE Co.
ULRIKE KLOPFER
COLMAN AND ANNE McDONOUGH

JOSHUA NETTLE
RAY OKONSKI (2)
ROBERT AND ANN SCHERBA
CHRISTOPHER SCHOOLEY
HERBERT E. SMITH (2)
TUSCON ALUMNI CLUB
SENATOR JOE YOUNG, JR.
UM CLUB OF RICHMOND, VA.

Western Qualifiers Moved

Sunrayce Headquarters has recently informed all teams that the Western Regional Qualifiers will be moved from Arizona to Milford, Michigan. The move was made because more teams are closer to Michigan than to Arizona. The "Western" Qualifiers (now called the First Round of Qualifiers) will be held from April 30 - May 2, with the Second Round of Qualifiers the next week. If you would like to see either round of qualifiers please contact the Solar Car Team Office for more information.