



# 2010 ANNUAL REPORT





Michigan Center for  
Advancing Safe Transportation  
throughout the Lifespan

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Transportation  
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## CENTER THEME

**M**-CASTL is a University of Michigan (U-M) Transportation Center, housed at the University of Michigan Transportation Research Institute (UMTRI). Our theme, Safety and Mobility throughout the Lifespan, was chosen to highlight our focus on efforts to promote the safety and mobility of both young and older adult users of the transportation system. We chose this theme because U-M has vast and relevant expertise in these areas and the theme is closely aligned with the US Department of Transportation's (DOT) strategic vision. M-CASTL strives to advance expertise and US technology in the many disciplines comprising the safety and mobility of both young people and older adults. The Center achieves this through basic and applied research, and by fostering the application of transportation science and technology through education of new professionals and technology transfer to those in transportation-related fields.

Both young people and older adults present unique safety and mobility challenges. M-CASTL was established to increase understanding of and address—across the different dimensions of the roadway, vehicle, and driver—risks related to the two ends of the age spectrum. Specific thrusts of M-CASTL focus on understanding and addressing: the changing perceptual, cognitive, and psychomotor abilities of older drivers;

the transportation needs of young people and older adults when they are unable or choose not to drive themselves; and the elevated crash risk of young drivers. M-CASTL is also dedicated to several operating principles: providing high quality education and training to students, professionals, and the community; collaborating with U-M units, other universities, industry, government, and other partners; and making our research and knowledge accessible to a global audience.



## DIRECTOR'S MESSAGE



**T**he issues of safety and mobility throughout the lifespan continue to be relevant for contemporary society. The US DOT's Secretary Ray LaHood has made reducing distracted driving a major national

priority. M-CASTL has helped Secretary LaHood meet this challenge by presenting research findings on technology and distraction at the Distracted Driving Summit held in Washington, DC and at the Michigan Traffic Safety Summit held in Lansing, MI. M-CASTL also sponsors work related to understanding and reducing distracted driving. Older driver safety and mobility issues continue to be covered in the media and M-CASTL has a number of ongoing activities addressing these issues. Some highlights over the past year include developing a searchable website of older adult safety and mobility programs called Promising Approaches for Promoting Lifelong Community Mobility; responding to a request from the editors of the Journal of the American Medical Association to write a commentary on dementia and driving; and becoming a formal partner with the Canadian Driving Research Initiative for Vehicular Safety in the Elderly (Candrive) project on older drivers.

M-CASTL was founded on the belief that most of the issues related to maintaining safe mobility

in our society will require solutions involving multidisciplinary researchers and practitioners. The Center leverages much of its resources to facilitate multidisciplinary collaboration. Our research program requires research teams to have varied backgrounds, including a team member who can help translate research findings into practical applications. M-CASTL research projects have involved U-M faculty from over a dozen groups around campus, faculty from several international universities, and members of national and state organizations. Our annual conference has a focus on providing networking opportunities for those interested in future collaborations. M-CASTL also sponsors groups like the Gerontological Society of America's Transportation and Aging Interest Group, in part, because of the multidisciplinary collaborations that continually grow out of the interest group's efforts.

This annual report spotlights the often intangible component of research, education, and technology transfer: creativity and imagination. We applaud the originality and ingenuity of our many partners and collaborators. Without this creative spark, many problems facing society will not be solved. In recognition of the importance of creativity and imagination in all of M-CASTL's activity, we feature some of the many sculptures and fountains found on the U-M campus in this year's annual report.

M-CASTL will continue to provide leadership in research, education, and technology transfer in both young and older adult safety and mobility, as well as continue to develop and recognize the

synergies among these groups. M-CASTL's theme of safety and mobility throughout the lifespan continues to be as relevant today as it was when we first proposed it. I encourage our stakeholders to contact us to discuss the problems and issues that are most important to them. In this way, M-CASTL can help to address important and topical issues and our results can be translated into practical solutions. If you have further questions or wish to support our efforts to improve safe mobility for young and older adults, I hope you will contact me.

Sincerely,

David W. Eby





## FROM THE PAST YEAR



**T**his past year has been especially rewarding and productive for M-CASTL. Some of the year's highlights are showcased here.

### 2010 Transportation Research and Education Conference

M-CASTL hosted its 3rd Annual Transportation Research and Education Conference on April 7, 2010 at the Michigan League on the campus of U-M.

Keynote speakers for the event were Dr. Joe Grengs of U-M Urban Planning who spoke about transportation access and disparities, and Dr. Sandra Rosenbloom, Professor of Planning and Adjunct Professor of Civil Engineering at the University of Arizona, who spoke about gender dif-

ferences in transportation. M-CASTL's director, David Eby, served as moderator for the conference and Dr. Mark Banaszak Holl (U-M Office of the Vice President for Research), delivered the opening comments. Breakout sessions included Emergency Medicine, Trauma, and Transportation; Mobility Management and Transitions from Driving to Non-Driving; Commercial Driver Issues; Law Enforcement and Transportation; Medical Conditions and Transportation; and Technology and Transportation. Collectively, the conference featured 32 presenters/moderators from 8 states. Between sessions, attendees enjoyed a lunch along with the opportunity to network with each other and with the speakers. For more information about the conference, please see our website at <http://mcastl.org/node/70>.

3RD ANNUAL TRANSPORTATION RESEARCH AND EDUCATION CONFERENCE

### Collaboration and Partnership Building

An important result of the ongoing collaborations fostered by M-CASTL has been a "sea change" in our thinking about how to go about making improvements in transportation. This new mindset can be characterized as thinking more globally and internationally about the issues that affect us locally. In part, this stems from the growing recognition that countries around the world are grappling with the same road safety issues as we are and that working together can have synergistic effects on all of our efforts. As importantly, the issues confronting road users cut across many disciplines and require a multi-faceted approach if they are to be addressed successfully. Increasingly, our first response to opportunities that arise for research or education is to think about who we can partner with on a global level to put together the best team to respond to the issue at hand. Using collaboration in this way has allowed us to overcome one of the main barriers identified by transportation stakeholders in making progress in this field – that is, the existence of "silos" that prevent various groups from communicating and coordinating their efforts to improve transportation safety.

As an example of this global and international approach, we are currently partnering with a multi-disciplinary group of researchers from the Canadian Driving Research Initiative for Vehicular Safety in the Elderly (Candrive) to better understand the driving behavior of older



## FROM THE PAST YEAR



adults and improve their driving safety. Also included in this effort are Australian researchers from Monash University Accident Research Centre (MUARC). A number of small-scale studies have come out of this collaboration and we are working to secure funding for larger-scale projects.

This past year we were fortunate to have had the opportunity to host some of our current and potential collaborators. On March 19, Katherine Freund, the President of ITN America, gave a talk at UMTRI that described the role of her company in meeting the unmet transportation needs of older people. ITN provides door-to-door rides, and allows older people to pay for services outright, or trade their own cars, volunteer, or use vouchers as payment. Ms. Freund is interested in adding an ITN affiliate in the Ann Arbor area. Dr. Ergun Uc, a neurologist from

the University of Iowa, visited U-M on March 31. Dr. Uc's work involves the study of movement disorders, and he has a special focus on the effects of Parkinson's disease on driving. He met with M-CASTL faculty and staff to discuss the potential for collaborations. Dr. Michelle Porter, Professor of Kinesiology and Recreation Management at the University of Manitoba in Canada and a PI for Candrive was at UMTRI on June 11. During her visit she gave a presentation entitled *The Challenges of Using Technology to Examine the Driving Patterns of Older Adults*. Dr. Judith Charlton and Jim Langford from MUARC also visited UMTRI at the same time, and the three met with M-CASTL personnel to discuss collaborative opportunities related to older adult safety and mobility. The group has decided to pursue sponsorship for research using instrumented vehicles to assess the effects of age-related medical conditions

RITA ADMINISTRATOR APPEL VISITS M-CASTL

on driving safety and mobility. Angela Berndt, a Lecturer and Occupational Therapist from the School of Health Sciences at the University of South Australia visited UMTRI on September 9-10. She gave a talk entitled *Safe, Risky, Cautious, or Chaotic: Profiling Driver Performance in Dementia*, as part of the UMTRI Colloquium series. Her visit was co-sponsored by M-CASTL.

### Peter Appel Visit

On November 10, Peter Appel, the Administrator of the Research and Innovative Technology Administration (RITA; M-CASTL's sponsor) visited M-CASTL, met with faculty and staff from M-CASTL and UMTRI, and toured UMTRI's facilities. M-CASTL was very pleased to have the opportunity to host Administrator Appel, tell him about the Center's activities, and hear about his vision for the future of the University Transportation Centers (UTC) program.



M-CASTL STAFF WITH KATHERINE FREUND, PRESIDENT OF ITN AMERICA



## FROM THE PAST YEAR



U-M FESTIFALL BOOTH FEATURED A SAFE DRIVING PLEDGE

### Participation in 2009 Distracted Driving Summit

Dr. David Eby, M-CASTL's Director, was invited to serve as an expert at the 2009 Distracted Driving Summit convened by US Transportation Secretary Ray LaHood. Dr. Eby presented on *Technology and Distracted Driving: A Double-Edged Sword*. His expanded comments from the summit are available on our website at <http://m-castl.org/files/DDSummitEbyExpandedComments.pdf>. Immediately after the summit, the Obama Administration enacted an Executive Order banning all text messaging by four million federal employees while they are on the job or using government issued mobile devices while driving. Secretary LaHood also launched a new government website ([www.distraction.gov](http://www.distraction.gov)) to provide the public with a comprehensive resource on distracted driving.

### Outreach to Students at U-M Festifall

On September 7, 2010, M-CASTL staff participated in U-M's Festifall, an annual event that provides an opportunity for campus organizations and university departments to reach out to the greater student community. M-CASTL gave out T-shirts in exchange for signed commitments from students to engage in safe driving behavior.



## FEATURED RESEARCH PROJECTS

### Young Unlicensed Drivers: Four Studies to Understand the Association of Lifestyle and Area Associated Risk

**Principal Investigator:**  
**C. Raymond Bingham** (UMTRI)

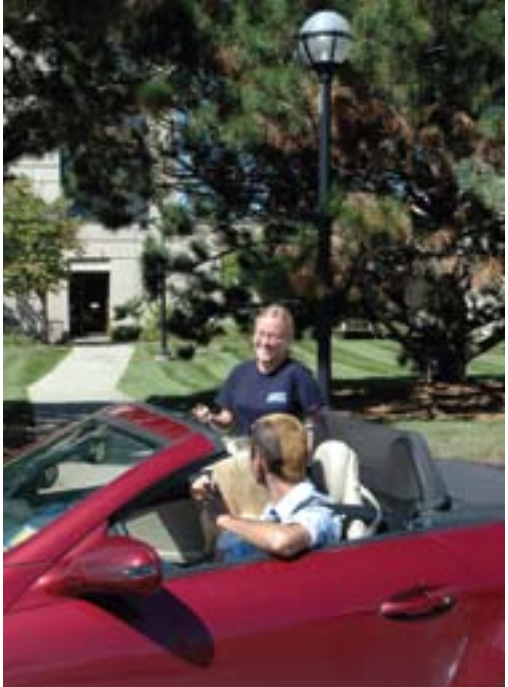
**Co-Investigator:**  
**Ana V. Diez-Roux** (U-M School of Public Health)

**Consultant:**  
**Christian L. Hanna** (Michigan Public Health Institute)

Eleven percent of young drivers killed each year in the US die in crashes involving a young never-licensed driver (i.e., a driver under age 19 who has never held a driver license; NLD). However, little is currently known about NLDs aside from their crash involvement. For the general population of drivers, we know that crash rates tend to be higher among younger drivers, males, and in rural areas, and that other health behaviors such as alcohol misuse and drug use are associated with risky driving. Little, however, is known about the characteristics of NLDs who have been in crashes.

This project was originally designed to include four small-scale studies of NLDs. However, only three of the four were ultimately carried out. The first study used data from the Fatality Analysis Reporting System and the US Census to characterize and identify differences in the areas in which NLDs are involved in fatal crashes. The second study examined a population-based cohort study linking Swedish national register data for a cohort of 1,616,621 individuals born between 1977 and 1991. The relative crash risk of licensed and unlicensed drivers involved in first-time road traffic crashes were estimated based on household socioeconomic position, social welfare benefits, and level of residential urbanicity. The third study used data from the Montana Youth Risk Behavior Survey to examine the psychosocial characteristics and problem behavior involvement of NLDs.

Several interesting findings came out of these studies. Consistent with other research, an association was found between socioeconomic indicators and crash likelihood. Urbanicity was also a significant factor, and moderated the association between material deprivation (i.e., the availability of local goods, services, resources, and amenities) and crash likelihood, with suburban area having a protective effect, thereby reducing the likelihood of a fatal NLD crash for a given level of material deprivation.



Fatal NLD crashes were less likely to occur in rural counties relative to urban and suburban areas. The researchers noted that this difference is a function of population and traffic density, and should not be confused with other research showing that rural areas have a higher rate of more serious crashes. They also cautioned that because the project examined frequencies and not rates of crash, it cannot be concluded that rural counties are less risky with regard to NLDs. As a function of time, fewer crashes occur in rural than in suburban areas, and a larger proportion of crashes in suburban and urban areas are less serious due to lower vehicle velocities while crashes in rural areas where two-way motorways and higher vehicle speeds are the norm result in a higher percentage of serious crashes. Therefore, the effect of rural counties is likely not a function of actual crash risk, but simply crash likelihood based on vehicle and population densities.

According to the researchers, the association between material deprivation and the likelihood of a fatal NLD crash at the area level is a likely outcome of several individual-level variables. Areas with greater

FEATURED RESEARCH PROJECTS

**Cognitive Training as an Intervention to Improve Driving Ability in the Older Adult**

**Principal Investigator:**  
**Rachael Seidler** (U-M Kinesiology)

**Co-Investigators:**  
**John Jonides** (U-M Psychology)  
**Martin Buschkuohl** (U-M Psychology)  
**Susanne Jaeggi** (U-M Psychology)  
**Jessica Bernard** (U-M Psychology)  
**Pamela Hall** (Michigan Office of Services to the Aging)  
**Peggy Brey** (Michigan Office of Services to the Aging)

material deprivation are also more likely to lack other resources, including transportation alternatives. At the individual level, this might translate into fewer financial resources and a lower likelihood of getting licensed due to the costs associated increasingly with driver education and licensure. In recent years, state driver education has increasingly been provided by private driver schools, and less often by public high schools. This has resulted in an increasing cost associated with getting licensed to drive, and may provide an incentive for some teens to drive without a license in order to have the mobility that they either need or desire. Another reason for the association between greater material deprivation and fatal NLD crash may also result from greater delinquency, problem behavior, and poorer psychosocial adjustment that are associated with lower socioeconomic advantage. It is possible that a major individual factor creating the association between material deprivation and fatal NLD crash is the greater likelihood that a larger proportion of teens in socioeconomically deprived areas are involved in problem behaviors, generally, including problem driving, which in this case includes driving without being licensed.

**T**he notion that cognitive and motor skills are plastic and can be improved with training is very exciting, because it opens up the possibility for rehabilitation and amelioration of age-related declines in performance. It has been shown that older adults can improve cognitive processes such as attentional control, memory, and speed of processing with training. Although transfer to other tasks has been reported, it is not clear whether benefits transfer to real-world tasks such as driving. The aging of the baby boomers will bring about new challenges for the safety of older drivers.

This project evaluated whether a 5-week cognitive training intervention resulted in improvements in measures of cognition, complex motor control, and performance in a driving simulator task for both young and older adults. Specific aims included: 1) to determine whether a 5-week working memory training program improves working memory performance for young and older adults; 2) to determine whether benefits associated with a 5-week working memory training program transfer to other cognitive and motor tasks thought to rely on working memory processes, including measures of fluid intelligence and complex motor tasks; and 3) to determine whether benefits associated with a 5-week working memory training program transfer to the complex, real-world skill of driving.

Identifying an intervention which allows older adults to extend their safe driving years would have immense societal benefits. Moreover, it is of theoretical interest to determine whether cognitive training improvements transfer to tasks that are both “near to” and “far from” the training task, because it would provide insight into which aspects of cognition are malleable with practice.

Twenty-nine young adults and 18 older adults were assigned to a dual task working memory training



FEATURED RESEARCH PROJECTS



intervention group. Twenty-seven young adults and 19 older adults were assigned to a knowledge training control group. The intervention group engaged in the dual n-back working memory training task previously shown to be successful in increasing working memory capacity, which shows transfer benefits to fluid intelligence. Control group participants performed a knowledge training task, which consisted of answering multiple choice questions about vocabulary words and general knowledge. The control task was designed to provide participants with the same experience coming into the lab, interacting with experimenters, and performing computerized tasks as the intervention group.

Performance was assessed on a variety of measures prior to initiation of the training regimen, at the completion of the 5-week training period, and at a 1-month follow up test point. The total assessment battery lasted approximately 3 hours and was conducted in two different sessions (i.e. morning and afternoon in a counterbalanced fashion over 2 days).

Young adults exhibited substantial performance gains on the dual n-back training task, consistent with earlier study results. The training effects transferred to differential improvements for the training group on other measures of working memory and speed of processing. Unlike the researchers' previous work, they did not observe transfer to measures of intelligence. They concluded that this may have been a by-product of the rather extensive pre and post test battery of assessments that they performed, particularly given that one of the intelligence measures was always performed last in the sequence of tests. Given this, participants may have been too fatigued and/or unmotivated to perform these tests well. Although the training benefits for the young adults did not transfer more broadly to improvements on the complex motor tasks and performance on the driving simulator courses, the researchers noted that performance for this group was quite high to begin with and the young adults may have had less room for improvement than the older adults. The older adult training group showed a gradual improvement in performance across the training period. Older adults showed greater improvements in the trained task from pre to post training than the control group. Unfortunately, they did not show significant transfer to the driving test conditions, supporting the notion that training tasks need to be made as specific as possible. There was a trend, however, for the older adult training participants to show transfer to the dual task walking while talking test. The researchers are currently following this up with additional analyses focusing on covariates.



## FEATURED RESEARCH PROJECTS

### A New Approach to Assessing Self-Regulation by Older Drivers: Development and Testing of a Questionnaire Instrument

**Principal Investigator:**  
**David Eby** (UMTRI)

**Co-Investigators:**  
**Lisa Molnar** (UMTRI)  
**J. Scott Roberts** (U-M School of Public Health)  
**Gary Bubar** (AAA Michigan)

**Consultants:**  
**Jim Langford** (MUARC)  
**Shawn Marshall** (University of Ottawa; Candrive)

**D**riving is a complex task that requires visual, cognitive, and psychomotor abilities. As people age, most will experience some loss in these abilities as a result of medical conditions, the medications used to treat them, or the aging process itself. Appropriate self-regulation of driving; that is, adjusting one's driving patterns by driving less or avoiding specific situations in which one feels unsafe or uncomfortable, shows considerable promise as a strategy for compensating for these declines and enabling older drivers to extend the time period over which they can safely drive. The purpose of this project was to better understand the process of self-regulation by older drivers and how it relates to important driver characteristics including sex, confidence in driving ability, and functional abilities by: 1) developing a computer-based questionnaire instrument to measure, in a comprehensive manner, the self-regulatory practices employed by older drivers; and 2) pilot testing the instrument with a sample of older drivers comprised of individuals with clinically-determined functional impairments in vision, cognition, or psychomotor ability, as well as normally functioning older adults recruited from the general population.

This project conceptualized self-regulation as both reducing the extent of driving exposure and modifying the nature of driving exposure. As a framework for examining and understanding self-regulation, a model of driver behavior and decision making including four levels was used. The lowest level, operational, has to do with the details of driving that are largely automated. The tactical level has to do with the actual maneuvers drivers make in traffic in response to conditions in the driving environment. Strategic behavior includes higher level decisions about trip goals, mode of transit, driving route, and circumstances under which to drive. The fourth level, termed "life-goals" was adapted from earlier work on young drivers and has to do with drivers' general motives and attitudes in life and how they affect driving.

Two major subgroups of participants were recruited for the pilot test of the questionnaire instrument – both subgroups were made up of current drivers age 70 and older with a valid driver license. The first subgroup for the study consisted of 105 normally functioning older adults recruited from the general population. The second subgroup consisted of 32 individuals with losses in vision, cognition, or psychomotor ability recruited from specialty medical clinics at U-M. Feedback from study participants about the content and administration of the questionnaire instrument indicated that most found it easy to read and understand, and were satisfied with using a computer to complete it. Almost three-quarters reported that given a choice of other options, they preferred to take the questionnaire on the computer, despite the fact that most reported only low or medium levels of experience with computers. The length of the questionnaire was also considered reasonable.

Several study findings are of interest. Overall, participants reported few life-goals changes with the exception of buying a different vehicle in the past year. Between a fifth and a quarter of participants



## FEATURED RESEARCH PROJECTS

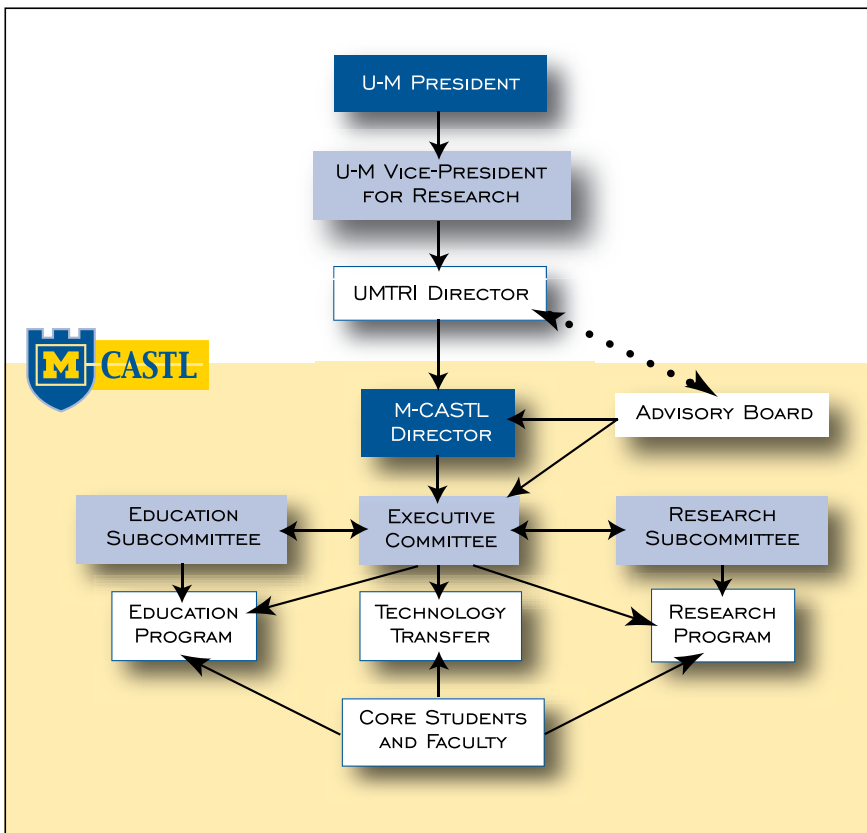


reported having reduced the number of days, trips, or miles per week, or the length of their trips during the past year. At the strategic level, sizable numbers of participants reported that they try to avoid a variety of specific driving circumstances. Most notably, over half of participants tried to avoid driving at night or in rush hour traffic, two-thirds tried to avoid driving in bad weather, and close to three-quarters tried to avoid driving at night in bad weather. Other driving circumstances including making unprotected left turns, driving on high traffic roads, and driving in unfamiliar areas were also avoided by close to one third or more of participants. Many planned out their trips ahead of time or reduced overall travel by combining trips. However, very few reported having made modifications to their vehicles during the past year to make driving easier. At the tactical level, a majority of participants tried to avoid in-vehicle distractions with the exception of changing ra-

dio stations, and most try to leave more room between their cars and the cars ahead of them. Few differences in these self-regulatory practices were found between men and women, or between younger and older participants. However, participants recruited from the clinic population were more likely than those recruited from the general population to report trying to avoid driving at night, in unfamiliar areas, and on the expressway, and talking conversationally with passengers. In addition, when self-regulation was assessed another way (by asking how often participants had modified their driving plans in the context of various scenarios), participants from the clinic population were more likely to report having modified their driving plans when the most direct route to their destination required driving on the expressway, in heavy traffic, or making unprotected left turns. It may be that we did not find more differences by sex or age group because of the generally high level of functioning among our sample. Finally, both driving comfort and safety were highly related to driving avoidance. In other words, if participants did not feel comfortable or did not feel safe driving in certain situations, they also reported that they avoided those situations. The researchers are currently collecting objective driving data that can be compared to self-reports of driving self-regulation through a separate M-CASTL-funded project.



## ADMINISTRATION



**M**-CASTL's organizational structure was designed to facilitate multidisciplinary input while maintaining efficient operations. The administration of M-CASTL includes input from more than 20 U-M units. M-CASTL is organized as shown in the figure. The Center is administered by a Director, an Assistant Director, a Program Coordinator, a Communications Coordinator, a research assistant, an Administrative Assistant, a Grant and Contracts Specialist, a Secretary, and an Executive Committee comprised of U-M faculty. An Advisory Board consisting of industrial, governmental, community and academic partners from outside U-M also provides input on the direction of M-CASTL activities. Core faculty and students from U-M participate in M-CASTL activities.



## ADMINISTRATION

### Center Personnel

The following individuals receive at least partial funding from M-CASTL to perform administrative activities



**Dr. David W. Eby, Director**  
(734) 763-2466 eby@umich.edu

David W. Eby, Ph.D., is a Research Scientist, Head of UMTRI's Behavioral Sciences Group, and Director of M-CASTL. As Director, Dr. Eby is responsible for overseeing all aspects of M-CASTL's operation. Dr. Eby earned a doctorate degree in experimental psychology from the University of California, Santa Barbara in 1991. An important component of Dr. Eby's research has been to improve the safety and mobility of older adults. He has investigated how in-vehicle navigation assistance systems might be useful for maintaining safe driving in the older population and he led the development and testing of a self-screening instrument intended to educate older adults about their current abilities, what those abilities mean for safe driving, and what older adults can do to continue driving safely. Dr. Eby has directed numerous projects related to transportation and aging. He has received sponsorship for his older adult commu-

nity mobility research from a variety of sponsors including, the National Highway Traffic Safety Administration, Centers for Disease Control and Prevention, AARP, the Alzheimer's Association, AAA Foundation for Traffic Safety, and the Michigan Office for Highway Safety Planning. Dr. Eby is a former convener of the Transportation and Aging Interest Group of the Gerontological Society of America. Dr. Eby has authored more than 200 journal articles, technical reports, and book chapters and is the first author of the book *Maintaining Safe Mobility in an Aging Society*.



**Lisa J. Molnar, Assistant Director**  
(734)763-2466 ljmolnar@umich.edu

Lisa J. Molnar, Assistant Director of M-CASTL, is responsible for assisting the Director in Center oversight; coordinating with state, federal, and international Center partners to identify new program needs and opportunities for collaboration; coordinating the research selection process and chairing the Research Subcommittee; assisting in monitoring of ongoing research projects; facilitating the translation of research products into technology transfer activities; and co-organizing the annual conference and other special events. Ms. Molnar is a Lead

Research Associate at UMTRI, where she has worked since 1986. Her primary areas of interest are traffic safety and driver behavior. She has worked on a variety of projects focusing on older driver safety and mobility; adolescent driving behavior; development and evaluation of traffic safety laws, policies, and programs; prevention of alcohol-impaired driving; and use and misuse of safety belts and child safety seats. Ms. Molnar has authored more than 100 scientific articles, technical reports, and book chapters. She holds a BA in Sociology from Michigan State University and a Master of Health Services Administration (MHSA) in Public Health Policy and Administration from U-M.



**Jonathon M. Vivoda, Program Coordinator**  
(734) 763-0342 jviv@umich.edu

Jonathon M. Vivoda, the Program Coordinator for M-CASTL, is a Research Associate at UMTRI, where he has worked since 1998. In addition to working for the Center, he is currently enrolled in the Health Behavior and Health Education (HBHE) department's PhD program at the U-M



## ADMINISTRATION

School of Public Health. During the school year, Mr. Vivoda works on M-CASTL activities as a Graduate Student Research Assistant. He holds a master of public health degree in HBHE, and a bachelor degree in psychology, both from U-M. Mr. Vivoda's research interests include age related driving problems, motor vehicle occupant restraint system use, driver distraction, the effects of ITS technology on driver behavior, and understanding motor vehicle crash trends. He is an expert in organizing and managing field data collection and has developed methods of using personal digital assistants (PDAs) for the collection of many types of field data. Mr. Vivoda has also performed critical reviews of traffic safety literature, and managed the collection and organization of various types of complex electronic and hardcopy data from sources such as law enforcement agencies, courts, and prosecutors.

### Renée M. St. Louis, Communications Coordinator

(734) 763-6185 rstlou@umich.edu

Renée M. St. Louis, the Communications Coordinator for M-CASTL, is a research assistant at UMTRI where she has worked since 2004. Ms. St. Louis' responsibilities at UMTRI include: providing general technical support to research faculty and staff; day to day management of project



activities; supervising employees during studies involving field data collection; and co-authoring proposals, technical reports, and papers. Ms. St. Louis' role with the M-CASTL team involves assisting with all Center activities associated with the three program areas: research, education, and technology transfer. Ms. St. Louis received her bachelor's degree in psychology from U-M in 2004. Her research interests include distracted driving issues related to both young and adult drivers, self-regulation of driving by older people, in-vehicle technology, and psychosocial factors that influence driving behavior.

### Nicole Zanier, Research Assistant

(734) 615-4744 nzanier@umich.edu

Nicole Zanier graduated from the University of Michigan-Dearborn in 2009 with a Bachelor of Arts degree in psychology. She works as a research assistant at the University of Michigan Transportation Research Institute (UMTRI), and serves in the same capacity for M-CASTL. Dur-



ing her undergraduate years, Ms. Zanier studied and researched psychological topics in behavior, aging, and experimental analysis. She is particularly interested in increasing the safety of younger and older drivers.

### Amanda Dallaire, Administrative Assistant

(734) 764-6240 dallaire@umich.edu

Amanda V. Dallaire, the Administrative Assistant for M-CASTL, has been working with M-CASTL since 2008. Ms. Dallaire serves as the "face" of M-CASTL, providing general administrative and clerical support, including monitoring M-CASTL's research projects, managing M-CASTL financials, and event planning. She attended Western Michigan University, majoring in psychology and economics; Baker College, studying accounting; and is currently attending The University of Michigan-Flint, taking classes in Business Administration.



## ADMINISTRATION



### Judy Settles, Contracts and Grants Specialist

(734) 615-4742 jisset@umich.edu

Judy Settles has worked at UMTRI for over 20 years and is a Contract and Grant Specialist. She completed the initial budget for M-CASTL and continues to assist with budget matters as needed.



### Bonnie Pond, Administrative Assistant

(734) 764-6504 bmckie@umich.edu

Bonnie Pond is an Administrative Assistant for UMTRI. She joined UMTRI in February of 2007.

She assists the Center by providing support with travel arrangements, processing time sheets, reconciling credit card statements, and serving as a backup for the Center's Administrative Assistant.



In addition to the M-CASTL-funded administrative personnel, several individuals from UMTRI also assist in the activities of the Center and are sponsored by UMTRI as part of M-CASTL cost share.

### Dr. Peter Sweatman, UMTRI Director

Dr. Sweatman chairs the Center's Advisory Board, provides guidance on Center activities, and represents M-CASTL's interests in the U-M administration.

### Cathy Seay-Ostrowski, UMTRI Business Administrator

Ms. Seay-Ostrowski assisted in the development of the first year Center budget and serves as a resource to research project investigators on project cost match issues. She prepared and presented workshops on identifying strategies for cost share/match for potential M-CASTL projects and continues to serve as a resource on this topic.

### Todd Anuskiewicz, UMTRI Business Development Manager

Mr. Anuskiewicz is working with M-CASTL staff to help find members for the M-CASTL SPIRET program and working in general to encourage outside organizations to become involved in the Center.

### Cathy Palazzolo, UMTRI Business Manager

Ms. Palazzolo provides administrative oversight on grant and financial related tasks for M-CASTL.

### Robert Sweet, UMTRI Information Resources Manager

Mr. Sweet assists M-CASTL staff and faculty on numerous tasks requiring information resources expertise such as literature reviews and editing technical reports.

### Joyce Daniels, UMTRI Editor

Ms. Daniels helps develop content for M-CASTL Messenger and other M-CASTL publications.

## M-CASTL's Executive Committee

The responsibilities of the Executive Committee are to implement the Center's Strategic Plan, develop the programmatic research areas, develop the programmatic educational opportunities, and provide general guidance for Center activities. The following U-M faculty members serve on the Executive Committee:

**Dr. Frank Ascione:** Professor, Social and Administrative Sciences, Dean, College of Pharmacy



## ADMINISTRATION

**Dr. William Barsan:** *Chair and Professor of Emergency Medicine, Medical School*

**Dr. Rosina Bierbaum:** *Dean and Professor of Natural Resources and Environment, School of Natural Resources and Environment*

**Dr. Bruno Giordani:** *Associate Professor of Psychology in Psychiatry and Psychology; Director, Neuropsychology Section, Department of Psychiatry; Clinical Core Director and Associate Center; Director, Michigan Alzheimer's Disease Research Center*

**Dr. Tim Gordon:** *Professor, Department of Mechanical Engineering*

**Dr. Richard Gonzalez:** *Professor and Chair, Department of Psychology*

**Dr. Jeffrey Halter:** *Professor of Internal Medicine, Chief, Division of Geriatric Medicine; Director, Geriatrics Center and Institute of Gerontology*

**Dr. James Jackson:** *Director, Institute of Social Research; Faculty Associate, Institute of Gerontology; Professor, Health Behavior and Health Education Department; Professor, Department of Psychology; Research Professor, Research Center for Group Dynamics*

**Dr. Daniel P. Keating:** *Director and Research Professor, Center for Human Growth and Development; Professor, Psychology/Psychiatry/Pediatrics*

**Dr. Jonathan Levine:** *Academic Program Chair and Professor, A. Alfred Taubman College of Architecture and Urban Planning*

**Dr. Nancy G. Love:** *Chair and Professor, Civil and Environmental Engineering*

**Dr. Kenneth E. Warner:** *Dean and Avedis Donabedian Distinguished University Professor, School of Public Health*

The following Office of the Vice President of Research (OVPR) representative and UMTRI Faculty serve on the Executive Committee:

**Dr. Mark Banaszak Holl:** *Associate Vice President, OVPR, Professor of Chemistry, LSA, Professor of Macromolecular Science and Engineering, College of Engineering*

**Dr. C. Raymond Bingham:** *Research Professor, Young Driver Behavior and Injury Prevention Group, UMTRI, Research Professor, Department of Psychiatry, School of Medicine, Research Professor, School of Public Health, Department of Health Behavior and Health Education*

**Dr. Daniel Blower:** *Associate Research Scientist, Vehicle Safety Analysis Group, UMTRI*

**Dr. Francois Dion:** *Assistant Research Scientist, Transportation Systems Group, UMTRI*

**Dr. Paul A. Green:** *Research Professor, Driver Interface Group, UMTRI, Adjunct Associate Pro-*

*fessor, Industrial and Operations Engineering, College of Engineering*

**Dr. David J. LeBlanc:** *Assistant Research Scientist, Engineering Systems Group, UMTRI*

**Dr. Walter S. McManus:** *Research Scientist, Automotive Analysis Group, UMTRI*

**Dr. Lawrence Schneider:** *Research Professor, Biosciences Group, UMTRI, Research Professor, Biomedical Engineering*

### M-CASTL's Advisory Board

M-CASTL's Advisory Board is composed of non U-M stakeholders who have an interest in the Center. The Board is chaired by Dr. Peter Sweatman. Committee members represent local, regional, and national transportation interests. Advisory Board members provide input on the Center's research and education program development. The following members serve on the Advisory Board:

**Dr. Peter Sweatman:** *(Chair) Director, UMTRI*

**Alby Berman:** *US Director of Marketing, Takata*

**Dr. Ann Dellinger:** *Epidemiologist and Team Leader, Deputy Associate Director for Science (Acting), Centers for Disease Control and Prevention*



## ADMINISTRATION

**Peter Kissinger:** *President and CEO, AAA Foundation for Traffic Safety*

**Angela Dragan:** *Engineer, Robert Bosch, LLC*

**David Morena:** *Safety and Traffic Engineer, Federal Highway Administration*

**Patrick Munich:** *Division Administrator, US Department of Transportation, Federal Motor Carrier Safety Administration*

**Jack Peet:** *Manager, Community Safety Services, AAA Michigan*

**Michael Prince:** *Division Director, Michigan Office of Highway Safety Planning*

**Roger Safford:** *Grand Region Engineer, Michigan Department of Transportation*

**Linda Scarpetta:** *Manager, Childhood and Unintentional Injury Prevention Section, Michigan Department of Community Health*

**James P. Vondale:** *Director Automotive Safety Office, Ford Motor Company*

**Dr. Drew Alan Walker:** *Michigan Office for Services to the Aging*

**Dr. Tao Zhang:** *Scientific Engineer, Telcordia*



UNIVERSITY OF MICHIGAN LAW SCHOOL BUILDING



## PARTNERSHIPS

**M**-CASTL has had a longstanding commitment to developing and nurturing partnerships to facilitate meeting two of our operating principles: collaborations and outreach.

### Strategic Partnerships for Innovative Research and Education in Transportation (SPIRET)

M-CASTL maintains the SPIRET program as a formal way for our partners to collaborate with M-CASTL. Members of the SPIRET team help guide the vision and future direction of M-CASTL, receive complimentary admission to our annual conference, are recognized on our website and promotional materials, and help make an impact on saving lives and promoting mobility.

**JOIN THE M-CASTL SPIRET TEAM**

*Strategic Partnerships for Innovative Research & Education in Transportation*

Be part of a team dedicated to meeting the transportation safety and mobility challenges that affect us all, through our children's, our older loved ones', and our own lives.

Support ground breaking research and education at the University of Michigan to advance the safety and mobility of young people and older adults.

This is an exciting opportunity to collaborate with the internationally recognized Michigan Center for Advancing Safe Transportation throughout the Lifespan (M-CASTL).

### Council of University Transportation Centers (CUTC)

UMTRI has been a member of CUTC for more than a decade. M-CASTL has continued this membership and actively participates in CUTC events. M-CASTL attends the Summer and Winter CUTC meetings to share our experiences and learn about the activities of other centers.

### Transportation Research Board (TRB)

M-CASTL members collaborate with TRB in a number of ways. M-CASTL members serve on TRB committees, including Occupant Protection, Safe Mobility of Older Persons, and Operator Education and Regulation. M-CASTL members and friends also present research at the annual conference, organize sessions, and help in reviewing papers.

### State Organizations

M-CASTL works with several Michigan organizations on issues related to safe mobility throughout the lifespan. The Center is represented on the Michigan Senior Mobility Workgroup that developed the strategic plan for aging and mobility in Michigan. M-CASTL will soon be starting a project funded by the Michigan Department of Transportation (M-DOT) to perform several activities that will result in recommendations for improving older adult safety and mobility in Michigan. Each year, M-CASTL works with

the Michigan Office of Highway Safety Planning by presenting at their Traffic Safety Summit. M-CASTL gave an opening address at the 2010 Traffic Safety Summit. M-CASTL is also working actively with several other state organizations:

- Michigan Department of Community Health
- Michigan Department of State
- Michigan Public Health Institute
- AAA Michigan
- Michigan Office for Services to the Aging

### Universities

M-CASTL is actively engaged in forming partnerships with both domestic and foreign universities. The following is a list of universities with whom the Center has supported collaboration efforts:

- University of Massachusetts, Boston
- East Carolina University
- Massachusetts Institute of Technology, Age Lab
- University of Florida
- Wayne State University
- Eastern Michigan University
- Yale University
- Central Michigan University, DEER Center
- University of Arizona
- University of Alberta (Canada)
- University of Waterloo (Canada)
- University of Ottawa (Canada)
- University of Victoria (Canada)
- Lakehead University (Canada)
- University of Manitoba (Canada)
- Monash University, Accident Research Centre (Australia)
- Curtin University of Technology (Australia)
- University of Western Australia (Australia)



## PARTNERSHIPS



### National Organizations

M-CASTL has continued relationships with several national organizations dedicated to safety and mobility. The Center developed a new website based on the document Promising Approaches for Promoting Lifelong Community Mobility, a review of community mobility programs that was developed with sponsorship from AARP. M-CASTL also continues its relationship with the Gerontological Society of America (GSA) Transportation

and Aging Interest Group. M-CASTL has co-sponsored this interest group's reception in the past and hosts their website. M-CASTL also works with the following national organizations:

- AAA Foundation for Traffic Safety
- Association of Driver Rehabilitation Specialists
- Easter Seals, Project ACTION
- Alzheimer's Association
- American Occupational Therapy Associate
- National Transportation Safety Board

PRESENTERS AT THE M-CASTL 2010 TRANSPORTATION RESEARCH AND EDUCATION CONFERENCE

### International Partnerships

M-CASTL has continued its efforts to nurture international partnerships this past year. The Center has made significant progress in developing these international collaborations. M-CASTL staff continue to meet with representatives of MUARC both in Australia and in Ann Arbor, MI to discuss collaborations and current projects. Researchers from Australia and Canada collaborate with researchers on M-CASTL sponsored projects. M-CASTL has been welcomed as partners in a research program lead by Candrive, a consortium of the top Canadian researchers who are interested in older adult safety and mobility. Candrive is conducting a large-scale, longitudinal study of driving in older adults in several sites across Canada. M-CASTL staff met with Candrive members in Ottawa and used Candrive-developed technology in an M-CASTL project. The Center continues to search for sponsorship so that we can participate fully in the Candrive project. Finally, M-CASTL is planning to work with Elsevier to host an international conference on Aging and Quality of Life in Ann Arbor, MI in 2012. This conference will bring together a multidisciplinary group of researchers from around the globe.



## RESEARCH

**M**-CASTL is committed to supporting a vigorous research program to improve the safety and mobility of young people and older adults. The Center encourages advanced research that involves and draws upon basic research results to provide a better understanding of phenomena and develop innovative solutions to convey its fundamental character, its broader objectives, and the great uncertainty in expected outcomes compared to problem-solving research.

### Research Excellence Program

Each year, M-CASTL seeks competitive proposals that address pressing transportation problems within one or more of the three thrust areas. Specific research topics within the thrust areas are chosen each year to guide the research selection process, based on input from Center stakehold-

ers and development of a research synthesis report identifying short and long-term research needs in support of the M-CASTL theme and reflective of the US DOT's national transportation research agenda. The Center's research selection process is designed to enable creativity, provide fairness and objectivity, facilitate application to real-world problems, and ensure research quality. All U-M faculty members are informed about the process and encouraged to submit proposals. Respondents are required to build a "quad-team" for research projects consisting of faculty members from at least two different U-M units, a student, and a government/industrial/community representative. The quad approach ensures multidisciplinary research, student involvement in projects, and the translation of research results into practical transportation solutions. Proposals are also required to include some matching funds for project costs.

The Center's Research Subcommittee, comprised of members of the Executive Committee and chaired

by the Assistant Director, oversees the proposal review and project selection process. All proposals undergo an administrative review and a peer review by three external reviewers with appropriate backgrounds (one of which must be from the US DOT and another of which must be from outside U-M). Once the review process is completed, the Subcommittee convenes and selects proposals for funding based on the peer-reviews and priorities of M-CASTL. These recommendations are presented to the Center Director who makes the final determination of project awards.



## NEWLY AWARDED RESEARCH PROJECTS



### Drowsy Driving Among Older Adults

**Principal Investigator:**  
**David W. Eby** (UMTRI)

**Co-Investigators:**  
**James S. Jackson** (Institute for Social Research)  
**J. Todd Arnedt** (Psychiatry and Neurology)  
**Toni C. Antonucci** (Social Sciences and the Humanities)  
**Jacqui Smith** (Institute for Social Research)  
**Lisa J. Molnar** (UMTRI)  
**Anita V. Shelgikar** (Neurology)  
**Jacob A. Nelson** (AAA National Office)

**T**he National Highway Traffic Safety Administration estimates that drowsy driving is related to more than 100,000 motor vehicle crashes each year which result in about 40,000 injuries and 1,550 deaths. Analysis of crash records has been used to identify groups among whom drowsy driving is considered most prevalent (e.g., young people, males, shift workers, and people with undiagnosed or untreated sleep disorders). However, such analyses are limited because they typically estimate drowsy driving crashes based on single-vehicle, run-off-road, drift-off-road, or drift-out-of-lane events occurring between midnight and 6:00 AM in which alcohol is not involved. Thus, crash records may not accurately reflect the prevalence and factors related to drowsy driving among older adults who tend to avoid night driving and so have fewer nighttime crashes in general. In addition, because of declines in critical driving skills resulting from age related medical conditions, drowsy-driving crashes among older drivers are more likely to be attributed to declining cognitive, perceptual, or motor skills than to drowsiness. There is a need for more detailed information about drowsy driving crashes among the older adult population.

The overarching goal of the project is to gain a better understanding of the prevalence of, and factors related to, drowsy driving among older adults in the US through a nationally representative survey. The project is intended to be completed in two phases. The first phase will involve developing and pilot testing the survey. The second phase will involve administering the survey to a representative sample of older adults in the US as part of national surveys conducted at the U-M Institute for Social Research (ISR), such as the Health and Retirement Study (HRS) conducted bi-annually. M-CASTL is supporting the first phase of this research project. Specific project tasks related to development of the survey will include: 1) conducting a detailed literature review and synthesis of topics related to older adult drowsy driving; 2) convening a multidisciplinary panel of experts to explore issues identified in the literature review; 3) conducting focus groups to further identify salient topics to be included in the survey; 4) based on results from the tasks 1-3, developing the survey instrument; and 5) pilot testing the survey instrument.



## NEWLY AWARDED RESEARCH PROJECTS

### Alertness Maintaining Task (AMT): Effects on Driving in Healthy Aging and Mild Cognitive Impairment

**Principal Investigators:**

**Bruno Giordani** (Neuropsychology)

**Carol Persad** (Neuropsychology)

**Co-Investigators:**

**James Ashton-Miller** (Institute of Gerontology and College of Engineering)

**Louis L. Tijerina** (Ford Automotive)

**Jeff A. Greenberg** (Ford Automotive)

### Development of a Protocol to Assess the Effects of Workload on Older Drivers: A Third Step

**Principal Investigator:**

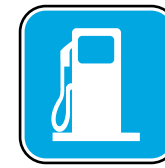
**Paul A. Green** (UMTRI)

**Co-Investigator:**

**Mark W. Newman** (School of Information)

**N**egative effects on driving accuracy and safety have been clearly demonstrated during conditions of distraction or when drivers are engaged in a competing task (e.g., cell phone use). However, more recent studies suggest that certain types of cognitive tasks (Alertness Maintaining Tasks, AMTs) can be used in situations of driving fatigue to actually increase alertness and reduce driving errors in younger drivers. Although the use of AMTs holds promise in this area, research on the effects of these tasks on driving performance in older drivers or drivers with pre-existing cognitive impairment has not been completed. A better understanding of the possible utility of AMTs in these two populations is clearly important, given these individuals' higher risk for driving errors and crashes. This pilot proposal compares three groups of individuals (young, healthy old, patients with mild cognitive impairment) using a STISIM driving simulator for an extended period of time to induce fatigue, followed by alternating driving and driving plus AMT conditions. The trivia-based AMT used in this proposal is presented via a Ford Automotive Sync System to allow for auditory task presentation and verbal responding. Participants also will undergo heart rate monitoring while using the STISIM, a brief neuropsychological test battery, and self report measures of fatigue and performance to better understand possible group differences. This project will combine efforts from the Department of Psychiatry, School of Engineering and Ford Automotive Company. The data from this pilot study will be used for future larger scale collaborative studies.

**O**lder drivers stop driving for a variety of reasons, including being overwhelmed by the workload of the primary driving task. Workload estimates for specific routes from an in-vehicle navigation system or Google maps could provide guidance. More fundamentally, validated workload predictions are needed to allow the comparison of studies that otherwise seem uncomparable, for example, differing in terms of the number of lanes or the amount of traffic. In an ongoing M-CASTL project, the SAVE-IT equation (which utilizes data that are automatically collected in driving studies) was used to predict subjective ratings of workload in a driving simulator. The equation predictions were correlated with the latest subject ratings, but were lower than before because of previously irresolvable technical problems with the anchor clips (showing low and high workload) used to ground the ratings (and for other reasons). In this project, the researchers will develop and evaluate improved anchor clips that show all traffic (not just the forward scene as before and shown below) to appear on a 2D display in the cab. Scenarios for anchor clips will be driven in the simulator and then the recorded images will be combined in a variety of ways. To determine the best configuration, 12-16 subjects will answer situation awareness questions concerning candidate anchor clip configurations. Subsequently, another 16 subjects will drive the simulator and rate the workload of modified scenarios from the previous experiment using the new anchor clips. To determine the effect of engagement (ratings while watching driving are higher than ratings while driving because the driver is in control), there will be one test block where each subject rates clips as a passenger. This experiment will take about 90 minutes/subject. The result of this project will be improved, validated anchor clips for a follow up, on-road experiment.



## RESEARCH PROJECTS IN PROGRESS

### Development of a Protocol to Assess the Effects of Workload on Older Drivers: A First Step

**Principal Investigator:**

**Paul A. Green** (UMTRI)

**Co-Investigators:**

**Mark W. Newman** (School of Information)

**Mr. Toshiro Muramatsu** (Nissan Technical Center North America)



**B**efore older drivers stop driving, there are transitional periods of restricted driving during which they do not drive on unfamiliar roads or roads that are difficult to drive, presumably of high workload. By knowing the workload associated with a particular route (from historic and existing datasets) and some assessment of the ability of a particular older individual to drive in certain situations (determined using a simulator), drivers could decide which of several routes they should drive, and if they should drive at all. The workload estimates could be a function added in next generation in-vehicle navigation systems or part of the directions calculation in Google maps. Using a driving simulator, this project is intended to answer several questions. How does driving performance degrade with increased workload? How well do the subjective and objective workload estimates from previous UMTRI work agree with each other? What are the differences between men and women on these measures?



## RESEARCH PROJECTS IN PROGRESS

### Assessing Driving in Older Adults: Perspectives of Vision Care Providers



### Driving Cessation & Caregiving Continuum: Adult Child/Parent Dynamic



**Principal Investigators:** Nancy K. Janz (U-M School of Public Health) and David C. Musch (Ophthalmology and Visual Sciences, Kellogg Eye Center)  
**Co-Investigators:** Brenda W. Gillespie (Center for Statistical Consultation and Research) and Ralph P. Crew (Crew Eye Center)

**M**any factors deter health care providers from discussing driving with their older patients, including concerns about the care provider/care recipient relationship, time restraints, and lack of knowledge and resources to support older drivers. This study is intended to survey Michigan vision care providers as a means to better understand the concerns, attitudes, and needs associated with assessing driving in older patients. The results of this survey will be used to: 1) inform vision care providers of the current Michigan attitudes and practices regarding assessment of their older patient's driving status; 2) design a more comprehensive survey of the broader health care provider community who deals with elderly drivers; and 3) ultimately develop assessment tools and intervention aids that will enable health care providers to more effectively address the needs of elderly drivers. It is hoped that the project will contribute to a more effective care provider/care recipient interaction that will lead to safer driving, reductions in crashes and associated morbidity and mortality, and therefore reduced costs to the health care and insurance systems.

**Principal Investigator:** Cathleen M. Connell (U-M School of Public Health)  
**Co-Investigators:** Lidia P. Kostyniuk (UMTRI) and Tina Abbate Marzolf (Michigan Area Agency on Aging 1-B)

**T**his project builds on the recognition that older adults who have to give up driving may face disruption in their ability to engage in tasks of daily living and maintain valued social activities and relationships. Driving cessation also has ripple effects for the entire family, especially adult children. The purpose of this project is to examine how older drivers and their adult children adapt to the "driving cessation continuum" by examining attitudes, beliefs, and reflections of matched pairs of adult children and their own parents. A total of 30 in-depth interviews will be conducted to assess family decision making and planning about this important transition. Results will inform the development of an intervention designed to help adult children and their parents discuss and plan for successful age-related transitions, including driving cessation.



## RESEARCH PROJECTS IN PROGRESS

### Using Vehicle Instrumentation to Better Understand the Transitioning Process: An Exploratory Study



### Belt-Positioning Booster Seats for Children: National Perspectives from Emergency Physicians and Parents



**Principal Investigator:** David W. Eby (UMTRI)  
**Co-Investigators:** Lisa J. Molnar (UMTRI), Edward D. Rothman and Danielle Gwinn (U-M Center for Statistical Consultation and Research), Shawn Marshall (Candrive/University of Ottawa, CA), Michelle Porter (Candrive/University of Manitoba, CA)

**V**ery little is known about the trip-specific driving patterns of older drivers and how these change over time, particularly as older adults begin to experience declines in functioning that can affect driving. Dementia represents a unique challenge for driving as it not only affects cognitive skills critical for driving, but also those skills necessary to benefit from self-regulation and planning for driving transition. Recent advances in technology make it possible to examine driving patterns for driver trips, using global positioning system (GPS) technology. This exploratory study is intended to assess the driving patterns of older drivers using objective measures of driving, and compare these patterns among older drivers with and without cognitive impairment. The specific aims are to: 1) develop tools for examining driving patterns in older drivers using Geographic Information System (GIS) data linked to GPS data that could be used in large-scale longitudinal studies; 2) use these tools to examine differences between older drivers with and without cognitive impairment; and 3) use these tools as a first step in validating a questionnaire on self-regulation of driving pilot-tested in a previous M-CASTL project.

**Principal Investigator:** Michelle Macy (UM-Emergency Medicine)

**T**he Child Health Evaluation and Research (CHEAR) Unit in the Division of General Pediatrics, is conducting a national study on emergency department physicians' knowledge, attitudes, and beliefs about child passenger safety. Surveys were mailed to 600 general and 600 pediatric emergency physicians in August 2010. The study also includes a national survey of parents of 4 to 8 year old children (using the C.S. Mott Children's Hospital National Children's Health Poll), to assess parents' opinions and experiences related to booster seats when transporting multiple 4 to 8 year old children. The parent survey was fielded in January 2010. A Poll Report released in March 2010 highlighted that booster-seat use remains low in older children and only one-half of parents with 4 to 8 year old children know their state law regarding booster seat use. This report received national media coverage on ABC, NBC, CBS, and FOX television networks in 131 cities and on websites including USA Today, AOL, and Yahoo News. These results also were presented by Dr. Macy at the University of Michigan Pediatric Health Services Research Seminar.



## COMPLETED RESEARCH PROJECTS

### Risk Taking Among Youth: A Literature Review

**Principal Investigator:** David W. Eby (UMTRI)  
**Co-Investigators:** Lisa J. Molnar (UMTRI), Jim Langford (MUARC), and Peter Palamara (Curtin University of Technology, Australia)

### Cognitive Training as an Intervention to Improve Driving Ability in the Older Adult

**Principal Investigator:** Rachael Seidler (U-M Kinesiology)  
**Co-Investigators:** John Jonides (U-M Psychology), Martin Buschkuehl (U-M Psychology), Susanne Jaeggi (U-M Psychology), Jessica Bernard (U-M Psychology), Pamela Hall (Michigan Office of Services to the Aging), and Peggy Brey (Michigan Office of Services to the Aging)

### Young Unlicensed Drivers: Four Studies to Understand the Association of Lifestyle and Area Associated Risk

**Principal Investigator:** C. Raymond Bingham (UMTRI)  
**Co-Investigator:** Ana V. Diez-Roux (U-M School of Public Health)  
**Consultant:** Christian L. Hanna (Michigan Public Health Institute)

### Driving Reduction and Cessation: Transitioning to Not Driving

**Principal Investigator:** Lidia Kostyniuk (UMTRI)  
**Co-Investigators:** Cathleen Connell (U-M School of Public Health) and Patricia Carrow (Michigan Office of Highway Safety Planning)

### A New Approach to Assessing Self-Regulation by Older Drivers: Development and Testing of a Questionnaire Instrument

**Principal Investigator:** David Eby (UMTRI)  
**Co-Investigators:** Lisa Molnar (UMTRI), J. Scott Roberts (U-M School of Public Health), and Gary Bubar (AAA Michigan)  
**Consultants:** Jim Langford (Monash University Accident Research Centre) and Shawn Marshall (University of Ottawa)

### Youth, Age, and Transportation Accessibility: An Intermetropolitan Comparison

**Principal Investigator:** Jonathan Levine (U-M Urban and Regional Planning Program)  
**Co-Investigators:** Joe Grengs (U-M Urban and Regional Planning Program), Lidia Kostyniuk (UMTRI), and Laurie Wargelin (Abt-SRBI, Inc)



## EDUCATION

### Outstanding Student of the Year

Each year, every UTC honors a student working with a Center by awarding the Outstanding Student of the Year Award. The selected student receives \$1,000 plus the cost of attendance (including travel) at the Transportation Research Board (TRB) Annual Meeting in Washington, D.C. At TRB, the student attends the CUTC awards banquet and receives a certificate from US DOT. For 2009, Jessica Bernard was named M-CASTL Student of the Year. Ms. Bernard is a doctoral candidate in Cognition & Cognitive Neuroscience in the U-M Department of Psychology. She is interested in better understanding how cognitive functions such as memory and attention are related to motor learning and performance particularly in healthy older adults. Currently, she is working on a project that uses a cognitive training intervention that improves working memory ability in the hopes of improving motor learning and performance as well as driving performance. Other lines of research include studies of interhemispheric communication and organization of the motor cortex in both younger and older adults, as well as studies looking at how different regions of the cerebellum play a role in both motor and cognitive tasks, again in both younger and older adults.

### M-CASTL Students

**Laith Alattar**, U-M Department of Psychology; Naturalistic Study of Seat Belt Use

**Jessica Bernard**, U-M Department of Psychology; Cognitive Training as an Intervention to Improve Driving Ability in the Older Adult

**Helinda Ho**, U-M Industrial Operations and Engineering; Development of a Protocol to Assess the Effects of Workload on Older Drivers: A First Step

**Stephanie Keteyian**, U-M School of Public Health; Assessing Driving in Older Adults: Perspectives of Vision Care Providers

**Giselle Kolenic**, U-M Department of Statistics; Using Vehicle Instrumentation to Better Understand the Transitioning Process: An Exploratory Study

**Danielle Robling**, U-M School of Public Health; Driving Cessation and Caregiving Continuum: Adult Child/Parent Dynamic

**Katherine Stone**, U-M Industrial Operations and Engineering; Development of a Protocol to Assess the Effects of Workload on Older Drivers: A First Step

**Jonathon Vivoda**, U-M School of Public Health; M-CASTL, Program Coordinator

**Anna Weiss**, U-M Industrial Operations and Engineering; Development of a Protocol to Assess the Effects of Workload on Older Drivers: A First Step



JESSICA BERNARD WITH HER US-DOT CERTIFICATE AS M-CASTL'S 2009 OUTSTANDING STUDENT OF THE YEAR.



## EDUCATION

### Professional Education Program

A primary educational objective of the Center is to expand U-M's role in continuing education for transportation safety and mobility practitioners through the use of various media, including on-site education, lectures and talks, hosting conferences and seminars, as well as web-based media. This program also provides funding for M-CASTL's experts to give presentations, serve on advisory boards, and conduct similar activities. Over the past year, several faculty and staff members gave presentations to various audiences throughout the US as well as abroad.

### Global Education Program

The purpose of M-CASTL's global education program is to provide transportation safety and mobility information to a widely dispersed audience efficiently and cost effectively, while elimi-

nating long-distance travel. M-CASTL's website will be the main distribution point, allowing anyone who has access to the internet and interest in learning about the topic to find more information. The program follows the Center's theme and focuses on both young and older drivers.

As stated in the previous annual report, the main focus of the global education program will be on creating web-based interactive education modules. These modules will feature a "television" theme and will collectively be known as the "M-CASTL Channel." A conceptual framework for the topics that will be covered has been developed, and content for the program is continuing to be developed. Academics and professionals with expertise in specific areas that affect driving have been identified and will be invited to contribute to the program by writing various sections. M-CASTL faculty and staff will also write several sections, and serve as editors of the entire module. The first module will cover issues related to aging and driving/mobility, with

a module related to young people and mobility to be developed later. These modules will be placed on the M-CASTL website for global access to English-speaking audiences. Where possible, modules will be translated into Spanish.

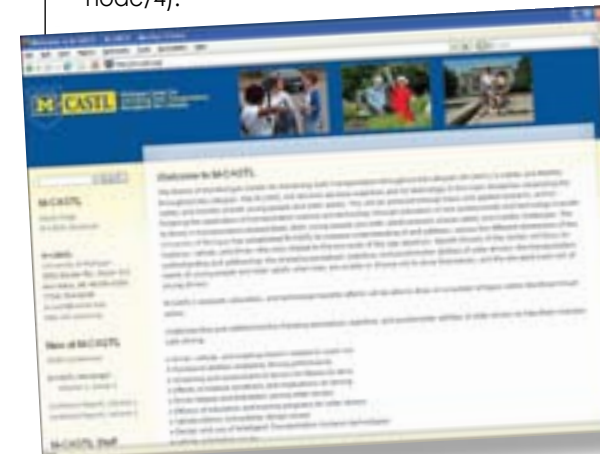
M-CASTL plans to launch the "M-CASTL Channel" during the next year.



## TECHNOLOGY TRANSFER

### Annual Report

M-CASTL's annual report presents an overview of the Center and its various activities, and showcases the Center's most important accomplishments throughout the previous year. Paper copies of the report are distributed to RITA, as well as each UTC. Electronic versions of this report, as well as the 2008 and 2009 annual reports are available for download in the Technology Transfer section of our website (<http://m-castl.org/node/4>).



### Website

M-CASTL's website is the place to go to find out about the most current events and activities taking place at the Center. The website is continuously updated by M-CASTL staff to ensure the most up-to-date information is distributed to interested parties. The website provides updates on research activities, RFP information, web access to completed projects', conference presentations and videos, and educational materials.

### Web Briefing Program

The website is also home to the Web Briefings program. As part of this program, each Center-funded research project is required to create a 5-minute video upon completion of their project. These videos include the principal investigator of the project, and sometimes other researchers, describing the purpose and methods of their research, results of the project, and the implications of their findings. These briefings provide convenient and rapid access for transportation practitioners to research in areas of current concern, and focus researchers on the need to make their results accessible to a broad audience.

### Conferences

The 3rd Annual Transportation Research and Education Conference was held on April 7, 2010 at the Michigan League. The main purpose of our annual conference is not only to disseminate the latest research findings, but also to bring together researchers, policy makers, industry representatives, and practitioners to provide opportunities to explore areas of mutual interest. The 2010 annual conference featured two keynote addresses, six different sessions, and a lunch which provided opportunities for networking among presenters and attendees.

This year, we were able to videotape all of the presentations from the conference (even during the concurrent sessions). If you were unable to attend the conference, or missed an interesting talk while participating in a different concurrent

session, visit the conference page (<http://m-castl.org/node/70>) on our website for PowerPoint presentations and videos.

M-CASTL is also working with the publishing company Elsevier to organize an international conference on Aging, Mobility, and Quality of Life in the summer of 2012. The conference is still in its formative stages so be sure to read future issues of our newsletter and check the website for more details.



### Newsletter

M-CASTL's quarterly newsletter, the Messenger, is produced and distributed to nearly 4,000 people, including faculty, staff, students, sponsors, and friends of the Center. The main purpose of the Messenger is to keep the public informed of new events and activities happening with M-CASTL. Each issue of the Messenger follows a similar format and includes a message from the Center Director; a feature story that focuses on a topic relevant to the Center's theme; updates on research, education, and technology transfer activities; and a section that highlights faculty, staff, and students who are working with M-CASTL. To date, M-CASTL has developed and disseminated 11 issues of the Messenger. All of these issues are available on our website.

**TECHNOLOGY TRANSFER**

**Synthesis Report**

The purpose of the annual synthesis report is to identify short and long-term research needs that support both M-CASTL's theme and US DOT's research agenda. The intent of the report is to review the most up-to-date literature related to young and older drivers, and to synthesize current relevant knowledge to help focus the Center's research program and to maintain continuity over each year of the grant. The synthesis report also serves as the background for the annual M-CASTL Transportation Research and Education Conference. The 2010 M-CASTL Synthesis Report was developed as a two volume set. The first volume, entitled "Older Adult Safety and Mobility" was completed and released in March. For an overview of this work, the full report can be downloaded from our website at <http://m-castl.org/files/2010SynthesisReport-Vol1.pdf>. The second volume with information on young drivers will be completed and made available on our website in the upcoming months.



**Promising Approaches**

In a recent UMTRI project funded by AARP, promising programs, practices, and initiatives for promoting lifelong community mobility were identified and published in a guide book (available in both paper and electronic versions). Building on and extending this work, M-CASTL has converted the guide into a website (<http://www.m-castl.org/promising-approaches/>) that is linked to the M-CASTL website. Using a website to house this information allows for easy updating of program information when new innovations are developed, and removal of programs that are no longer available. The programs included on the Promising Approaches website are divided by category for easy browsing, and are also searchable by keyword. M-CASTL would like to encourage all of our readers to check our Promising Approaches website when thinking about planning or implementing programs of their own. We are also looking to our stakeholders to help us identify promising programs and practices, as well as update our information about existing programs. If you are involved in the

development, implementation, ongoing conduct, or evaluation of what you consider to be a promising program, practice, or initiative, please let us know about it by submitting information to us at [promising-approaches@umich.edu](mailto:promising-approaches@umich.edu).



**M-CASTL on Facebook**

In an effort to reach the largest and most diverse audience as possible, M-CASTL has created a page on Facebook to promote the Center and its activities. With over 500 million users, the social networking site will hopefully draw more visitors to M-CASTL's main website to gather more information. M-CASTL's Facebook page allows for quick and convenient access to information about the Center's activities. It is also another way for interested parties to communicate with Center staff as well as network with others who may have similar ideas and interests. Photos from the 2010 Transportation Research and Education Conference have been posted. We encourage you to join and share your photos and ideas. To Like the M-CASTL page, click <http://www.facebook.com/pages/M-CASTL/118800127136>.



**FACILITIES AND RESOURCES**



**M**-CASTL is located on the campus of U-M. Founded in 1817, U-M currently has more than 40,000 students and an estimated 425,000 living alumni. Degree programs at the bachelors, masters, and doctorate level are offered in a broad range of disciplines including engineering, business, law, public health, psychology, urban planning, and public policy, as well as graduate degrees in medicine, pharmacy, and nursing.





## FACILITIES AND RESOURCES



### UMTRI

M-CASTL is housed at UMTRI, serving as a bridge between disciplines and stimulating interactions with other U-M units and departments. UMTRI was founded in 1965 through gift funds to the U-M totaling \$10,000,000, of which \$4,000,000 was used to construct the present four-story building. UMTRI operates a transportation-research program with an annual budget of about \$13,700,000. The multi-disciplinary approach to solving transportation-related problems taken by UMTRI is reflected in the variety of disciplines represented within the Institute, and by its involvement with other units at the University. Present staff is about 140 including 50 permanent

research staff and 8 teaching faculty affiliated with University academic departments. UMTRI faculty and staff represent a broad array of disciplines and backgrounds including but not limited to engineering, gerontology, psychology, public health, sociology, transportation planning, and urban planning. Many basic research questions can best, and in some cases only, be answered by a multi-disciplinary approach seldom possible in the traditional disciplinary structuring of a university. One objective of UMTRI is to provide a setting for University faculty in which this can be accomplished to generate new basic knowledge and to provide student training at several levels. UMTRI offers several assets that are available to support Center activities including:



- Research Information and Publications Center
- Driving Simulator
- Eye Fixation Recording System
- Instrumented Vehicle Fleets
- Data Acquisition System
- Naturalistic Driving Database
- Sled Impact Test Facility
- Impact Biomechanics Facilities
- Vehicle Ergonomics Laboratories



## FACILITIES AND RESOURCES

### Other U-M Facilities and Resources

U-M has a vast array of facilities and resources on which M-CASTL can draw to support its research, education, and technology transfer activities. A partial list is provided below.



### Adolescent-Related

The Prevention Research Center of Michigan conducts community-based participatory prevention research aimed at improving health status and reducing morbidity and mortality among populations experiencing a disproportionate share of poor health outcomes. The Center for Human Growth and Development fosters multi-disciplinary collaborations among biomedical, behavioral, and social scientists to optimize children's physical, cognitive, and socio-emotional development. Dr. Daniel Keating, Director of the Center, serves on the M-CASTL Executive Committee.



### Aging-Related

The Claude D. Pepper Older American Independence Center promotes collaborative multidisciplinary research to integrate basic science, clinical science, and health services research relevant to the health care problems of older adults. The U-M Drive-Ability Program, housed in the Department of Physical Medicine and Rehabilitation, provides comprehensive driving evaluations for individuals with physical, visual/perceptual, and/or cognitive impairments. The U-M Institute of Gerontology is home to a world-class faculty whose research interests range from the social and economic to the molecular and biological changes that occur in an aging population. Collectively, faculty members are committed to pursuing interdisciplinary and multidisciplinary research projects that look at the changes of aging from all aspects. Dr. Jeffrey Halter, Director of the Institute, is a member of M-CASTL's Executive Committee. The Michigan Alzheimer's Disease Research Center strives to ensure that all individuals and families in Michigan have access to the most advanced diagnostic and treatment techniques and the most

current information about research findings. Dr. Bruno Giordani, Director of the Clinical Core of the Center, serves on the M-CASTL Executive Committee. The Michigan Center for Urban African American Aging Research is a collaborative enterprise between U-M and Wayne State University fostering high quality scholarly and empirical training, research, and interventions focused upon health promotion and health among older racial and ethnic minority populations. Dr. James Jackson, the principal investigator of the Center, is a member of M-CASTL's Executive Committee. The U-M Geriatrics Center strives to enhance geriatric related research, education, and patient care by improving interaction and cooperation among faculty representing various schools and institutes at the University. Over 100 affiliated faculty members are principal investigators on grants totaling approximately \$25,000,000 per year in direct costs.

### Engineering

The Automotive Research Center is a U-M-based US Army Center of Excellence for advancing technology of high fidelity simulation of military and civilian ground vehicles. The Biomechanics Research Laboratory, located in the U-M Department of Mechanical Engineering, conducts theoretical and experimental investigations aimed at reducing the incidence of unintentional injuries. The U-M Center for Ergonomics, located in the College of Engineering, aims to further knowledge about human abilities as they relate to how humans interact with equipment in all settings including work, transportation, defense, daily living, education and leisure.



## FACILITIES AND RESOURCES

### Information Technology (IT)

U-M has many computing and IT services designed to support teaching and research. All U-M faculty and students have access to the vast IT resources available at the U-M, including campus-wide computing sites, and wireless access.



### Statistical Support

The Center for Statistical Consultation and Research (CSCAR) provides statistical services to faculty, primary researchers, graduate students and staff of the University. CSCAR maintains a staff of consultants to help researchers: select appropriate and contemporary statistical methodology; implement statistical methodology using one or more of the standard statistical computer programs (e.g., SAS, SPSS, SYSTAT, S-Plus, Stata, R, HLM, LISREL, and AMOS); present the results of statistical analyses, including graphical presentation; and interpret the results of various statistical methods and determine what conclusions are statistically justifiable. CSCAR also provides advice on database design and management. For projects that require more statistical

services than CSCAR can offer without charge, CSCAR and its staff are available to submit joint, collaborative research grant/contract proposals or to enter into subcontract agreements. Such agreements might cover any or all of the various statistical/quantitative aspects of the research. CSCAR also presents workshops on statistical methods and statistical software (e.g., SAS, SPSS, calculating sample size, structural equation modeling, missing data, and survival analysis), as well as general reviews of statistics.

### Survey Research

The Institute for Social Research (ISR) is the world's largest academic social science survey and research organization. ISR is a leader in developing and applying new social science methods, and is committed to educating the next generation of social scientists. ISR's annual budget of more than \$80 million supports the research of more than 200 scientists from 20 disciplines, including psychology, business, economics, public health, demography, statistics, and engineering. Survey studies include the Reuters/University of Michigan Surveys of Consumers, the Health & Retirement Study, the National Survey of American Life, the Monitoring the Future Study, the Panel Study of Income Dynamics, and the World Values Study. While these studies are among the most visible work conducted at ISR, the institute also develops and tests survey methodologies; conducts experimental studies; maintains and distributes the world's largest archive of social science data; and trains and educates researchers and students from around the world in survey methodology and survey research. The Director of ISR, Dr. James Jackson, is a member

of M-CASTL's Executive Committee.

### External Resources

As our partnerships with individuals around the world continue to expand, so too does our access to the research, educational, and technology transfer resources of our collaborators. Of special note are two – MUARC and Candrive. MUARC, formed in 1987, is Australia's largest multi-disciplinary research center specializing in the study of injury and injury prevention. MUARC undertakes applied research contracts for government and industry clients throughout Australia and internationally. More fundamental research is undertaken through research grants. MUARC has close to 90 staff and postgraduate students. Centre staff has expertise across a wide range of disciplines including biostatistics, computer science, engineering (varied disciplines), epidemiology, human factors, industrial ergonomics, medicine, nursing, psychology, public health, and statistical analysis. Initiated in 2002, Candrive is an interdisciplinary health related research program dedicated to improving the safety of older drivers. It is funded by a Team Grant from the Canadian Institutes of Health Research (CIHR) and also receives support from the Ottawa Hospital Research Institute (OHRI). OHRI is an Affiliated Research Institute of the University of Ottawa and the research arm of the Ottawa Hospital. The OHRI has grown rapidly to become one of the largest and most important hospital-based research institutes in Canada, with more than 1,500 scientists, investigators, graduate students, research fellows, and support staff; \$100 million in funding; and thousands of patients enrolled in clinical trials.



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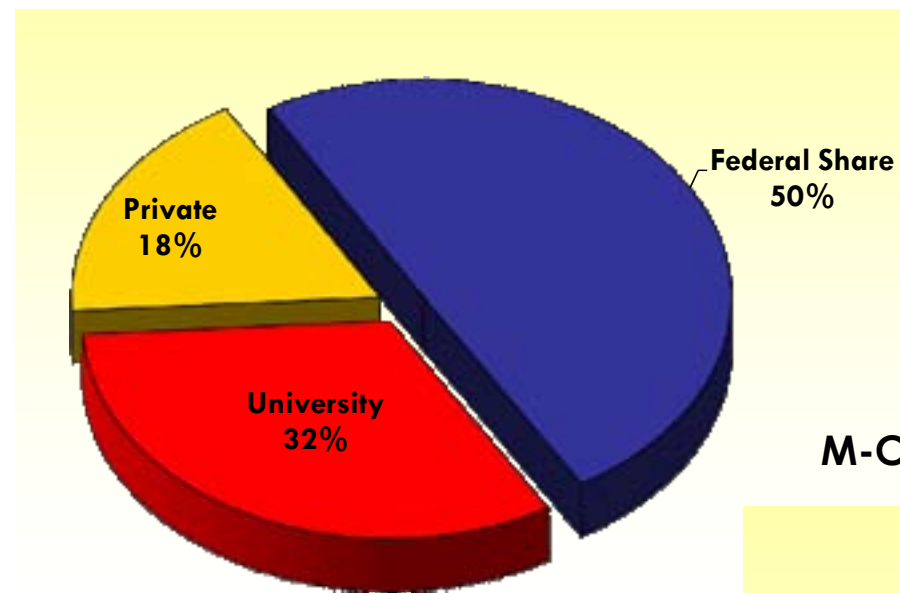
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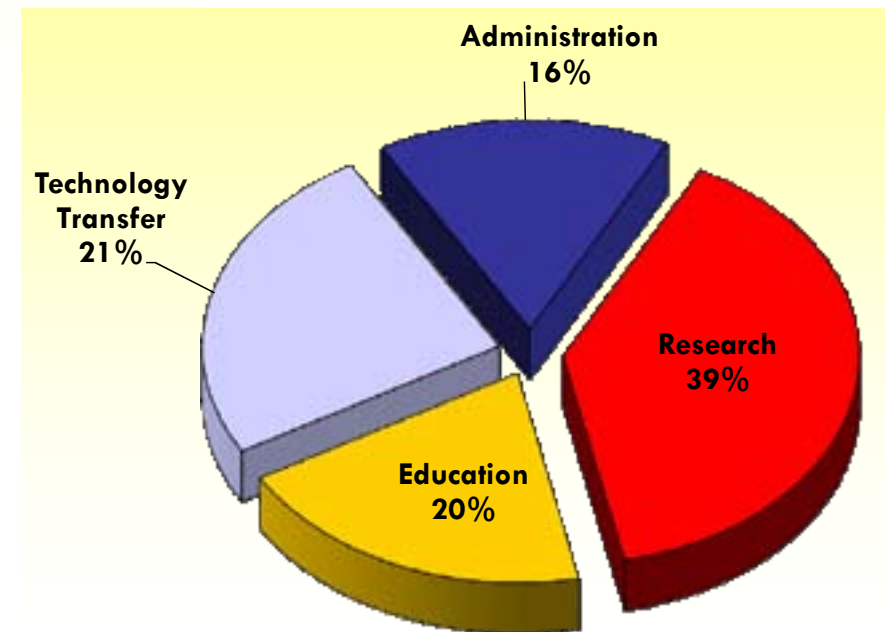


APPENDIX: FINANCIAL REPORTS

M-CASTL FY 2009-2010 Funding Sources



M-CASTL FY 2009-2010 Expenditures





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