

Driven to Discover Research Facility at the Minnesota State Fair

2023 Annual Report

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“It was absolutely beyond our wildest dreams. The entire project at the State Fair was a lot of fun and a huge success.”

– 2018 D2D investigator



1367 COSGROVE
MINNESOTA STATE FAIRGROUNDS

“This is an amazing opportunity to be engaged with the community and to collaborate with students and colleagues in our school. It's also great to meet other researchers.”

- 2023 D2D investigator

OUR STORY

Launching in 2014, the Driven to Discover Research Facility at the Minnesota State Fair – better known as D2D – links the substantial research capacity of the University of Minnesota with the largest public gathering in Minnesota. This innovative facility, the first of its kind in the nation, helps build a culture of research participation in Minnesota and accelerate learning on issues critical to the health and wellbeing of our citizens.



Serving as a forum for knowledge and ideas, D2D allows fairgoers to participate in research in an exciting, innovative, and convenient way. Most studies take under 20 minutes. With space for up to 50 researchers per day to recruit participants and collect data over the course of the fair, the D2D Research Facility allows researchers to meet enrollment goals in a matter of hours or days (as opposed to months or years), and provides a broader pool of participants than typically accessible.

Since 2014, the D2D program has reached over 435,000 fairgoers, one-quarter of whom hail from Greater Minnesota. To date, nearly 150,000 individuals have participated in 377 studies.

OUR MISSION

- Showcase UMN research
- Support fast, efficient recruitment with access to diverse participants
- Promote faculty & student engagement
- Provide opportunities for collaboration



OUR IMPACT



Connecting the Community with Research

- **Promote greater citizen participation in research:** D2D is showing that it is possible to “crowd source” research. An estimated 20% of Minnesotans attend the fair in a given year and thousands participate on-site in research at D2D, many of whom have no prior experience with research and few opportunities to become involved with in-person research. Through one-on-one interactions with University student and faculty investigators, citizens gain enthusiasm for scientific inquiry and gain awareness of the importance of research.

Accelerating Research Impact

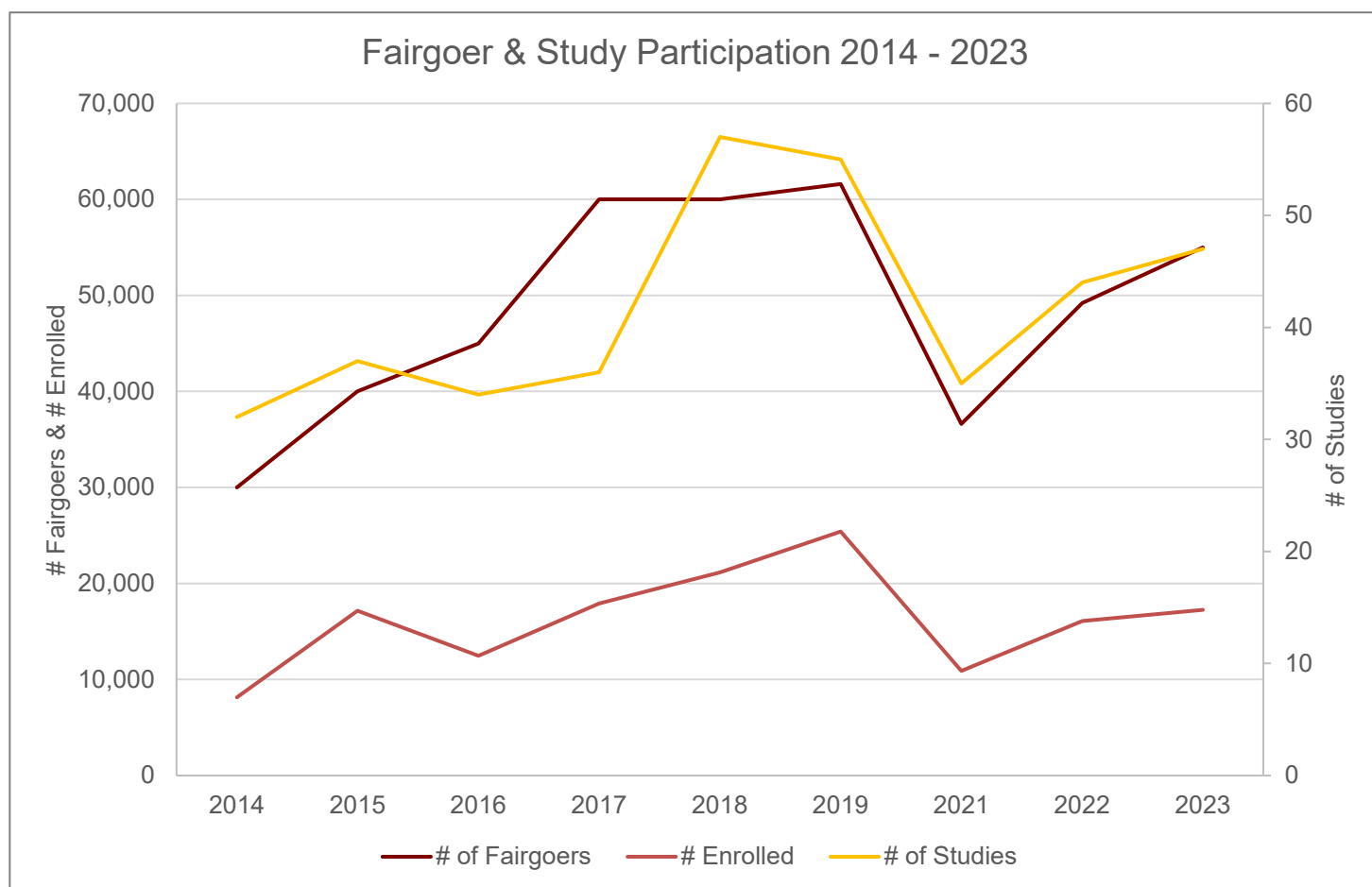
- **Rapid recruitment:** The rapid recruitment of research participants at D2D is far beyond what researchers can normally accomplish through traditional recruitment methods. Researchers using the D2D facility have reported it would have taken from 1-3 years to recruit the same number of participants.
- **Enable innovative studies and longitudinal tracking:** D2D’s State Fair setting provides endless possibilities for researchers to design and execute innovative studies, such as large-scale genomic collections. Many fairgoers return to the fair each year, enabling low-cost longitudinal follow-up not feasible in other venues.
- **Showcase University of Minnesota research:** D2D provides a public face for the University; building visibility for the wide scope of University research and providing Minnesotans the opportunity to interact with U of M researchers on an individual level. The program also provides researchers an easy way to communicate research results directly to the public.



Building Traffic & Enrollment, 2014 - 2023

TO DATE:

- FAIRGOER FOOT TRAFFIC - 437,400
- FAIRGOERS ENROLLED - 146,478
- 377 STUDIES
- 40 COLLEGE/SCHOOL PARTNERS
- 110 DEPT/DIVISION PARTNERS

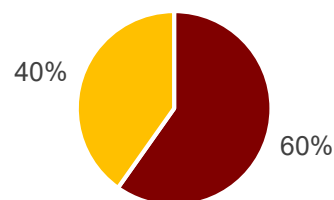


Health Science vs Non-HS Participation 2014 - 2023

WHAT DO THESE NUMBERS TELL US?

- Fees, instituted in 2016, have historically limited non-HS investigators as compared to HS investigators
- Starting post-pandemic, the split between HS & non-HS participation is growing

Overall HS vs Non-HS PIs

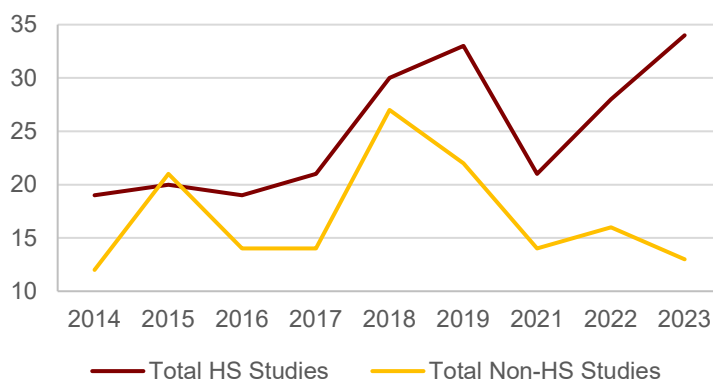


■ Total HS Studies ■ Total Non-HS Studies

D2D STUDIES

	HS	Non-HS	Total	%-age HS
2014	19	12	31	61%
2015	20	21	41	49%
2016	19	14	33	58%
2017	21	14	35	60%
2018	30	27	57	53%
2019	33	22	55	60%
2021	21	14	35	60%
2022	28	16	44	64%
2023	34	13	47	72%
Average				60%

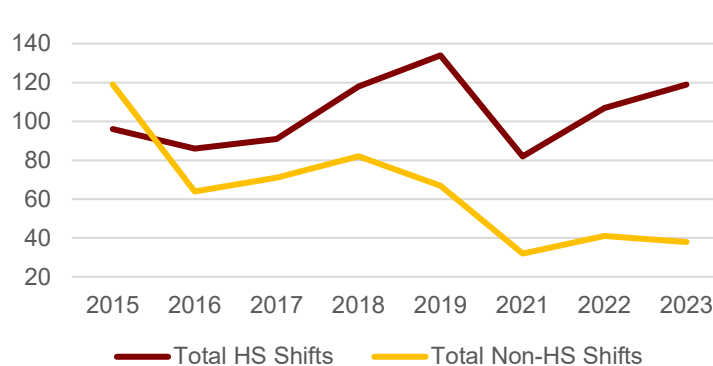
Yearly HS vs Non-HS Studies



D2D SHIFTS

	HS	Non-HS	Total	%-age HS
2014	111	70	181	61%
2015	96	119	215	45%
2016	86	64	150	57%
2017	91	71	162	56%
2018	118	82	200	59%
2019	134	67	201	67%
2021	82	32	114	72%
2022	107	41	148	72%
2023	119	38	157	76%
Average				62%

Yearly HS vs Non-HS Shifts



Health Sciences Research at D2D

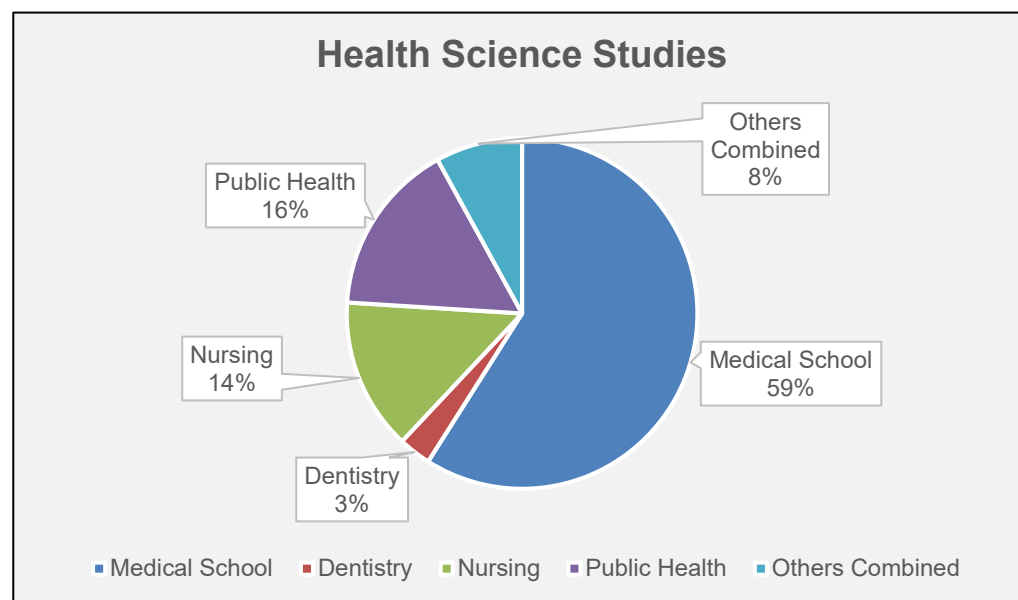
STUDIES WITH PRINCIPAL INVESTIGATOR INSIDE HEALTH SCIENCES

	2014	2015	2016	2017	2018	2019	2021	2022	2023
	# of Studies	# of Studies	# of Studies	# of Studies	# of Studies	# of Studies	# of Studies	# of Studies	# of Studies
College of Pharmacy	0	0	0	1	1	0	1	0	0
College of Vet Med	0	0	0	0	0	1	0	0	1
Medical School	13	16	11	10	15	20	13	17	17
School of Dentistry	1	0	0	1	1	1	1	2	0
School of Nursing	2	2	0	3	5	4	4	6	6
School of Public Health	3	1	4	4	7	7	2	2	5
Allied Health Programs	0	1	1	0	1	0	0	1	1
Others Combined	0	0	3	1	0	0	0	1	2
Total Health Sciences	19	20	19	21	30	33	21	29	32

Others include: CSH, FPD, CTSI, MCC

WHAT DO THESE NUMBERS TELL US?

- Health Science participation continues to grow
- Medical School is heaviest user, 59% of D2D studies overall



Non-Health Sciences Research at D2D

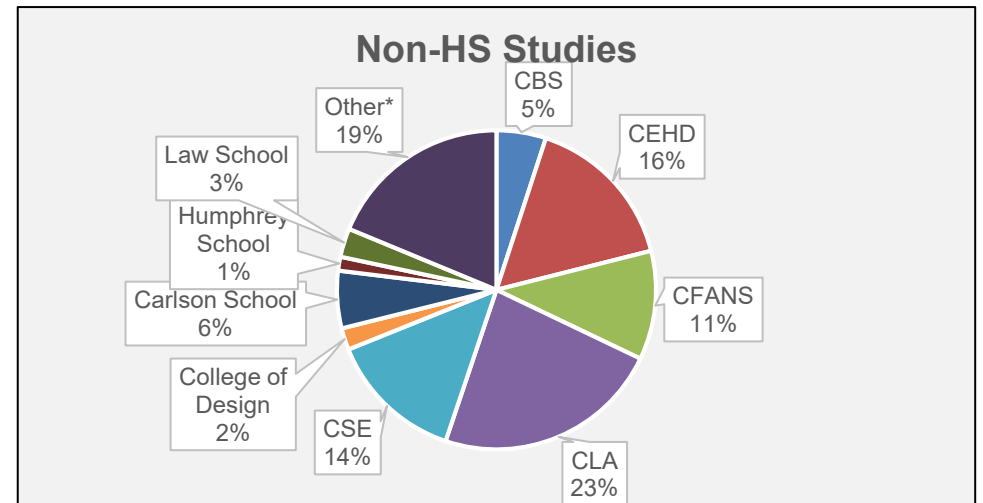
STUDIES WITH PRINCIPAL INVESTIGATOR OUTSIDE HEALTH SCIENCES

	2014	2015	2016	2017	2018	2019	2021	2022	2023
	# of Studies	# of Studies	# of Studies	# of Studies	# of Studies	# of Studies	# of Studies	# of Studies	# of Studies
College of Biological Sciences	1	1	1	1	1	1	0	1	0
College of Edu & Human Development	2	4	4	5	3	2	1	1	5
College of Food, Ag & Natural Resources	2	4	1	1	2	4	0	1	0
College of Liberal Arts	4	8	4	2	5	4	1	4	3
College of Science & Engineering	0	1	1	2	5	5	2	3	1
College of Design	0	0	0	0	0	1	1	1	1
Carlson School	0	1	2	2	2	0	0	1	0
Humphrey School	0	0	0	0	1	1	1	0	1
Law School	1	1	0	1	1	0	0	0	0
Other*	2	1	1	0	7	4	8	2	4
Total Non-HS	12	21	14	14	27	22	14	14	15

* - Crookston, Duluth, Rochester, HRPP, Libraries, External

WHAT DO THESE NUMBERS TELL US?

- D2D's reach is broad across Schools & Colleges outside the HS
- CLA & CEHD account for 40% of non-HS investigators



2016 - 2023 Shift Revenue

		Health Sciences			Non-Health Sciences			Total Shifts	Total Revenue
		# of Shifts	Shift Type	\$	# of Shifts	Shift Type	\$	#	\$
2016	RO	14	16%	\$3,500	8	12%	\$2,000	22	\$5,500
	OS	72	84%	\$58,032	58	88%	\$46,748	130	\$104,780
	Total	86	100%	\$61,532	66	100%	\$48,748	152	\$110,280
2017	RO	22	24%	\$5,500	20	28%	\$5,000	42	\$10,500
	OS	69	76%	\$55,614	51	72%	\$41,106	120	\$96,720
	Total	91	100%	\$61,114	71	100%	\$46,106	162	\$107,220
2018	RO	37	31%	\$9,250	5	6%	\$1,250	42	\$10,500
	OS	83	69%	\$66,898	77	94%	\$62,062	160	\$128,960
	Total	120	100%	\$76,148	82	100%	\$63,312	202	\$139,460
2019	RO	33	24%	\$14,850	0	0%	\$0	33	\$14,850
	OS	105	76%	\$91,035	69	100%	\$59,823	174	\$150,858
	Total	138	100%	\$105,885	69	100%	\$59,823	207	\$165,708
2021	RO	12	15%	\$5,400	4	13%	\$2,180	16	\$7,580
	OS	70	85%	\$60,690	26	87%	\$27,372	96	\$88,062
	Total	82	100%	\$66,090	30	100%	\$29,552	112	\$95,642
2022	OS	113	95%	\$91,902	33	100%	\$28,611	145	\$120,513
	Ext	6	5%	\$8,100	0	0%	\$0	6	\$8,100
	Total	119	100%	\$100,002	33	100%	\$28,611	151	\$128,613
2023	OS	117	98%	\$101,439	38	100%	\$32,946	155	\$134,385
	Ext	2	2%	\$2,700	0	0%	\$0	2	\$2,700
	Total	119	100%	\$103,173	38	100%	\$32,946	157	\$137,085

D2D Fee Structure

	2016	2019
RO = Recruitment Only	\$250	\$450
OS = On Site Data Collection	\$806	\$867
Ext = External		\$1350

WHAT DO THESE NUMBERS TELL US?

- Fees: instituted 2016; raised 2019; RO dropped 2022 (alignment with ISO policy)
- Drop in non-Health Sciences revenue post-COVID
- ISO model requires budget & anticipated shifts set in the fall. D2D has never met anticipated shifts/expenses to meet budget expectations
- D2D is in a catch-22: raising fees to meet expenses restricts use, but keeping rates low results in debt

2023 Recap

- Visitors = 55,024
- Subjects enrolled = 17,260
- Studies = 47
 - 38 on-site data collection
 - 9 recruitment, retention or community engagement
- PI Satisfaction = 100% Very Satisfied or Satisfied

On average:

- Subjects per shift, per study = 153 (range 20 - 375)
 - Adult studies = 187 (38 - 375)
 - Child studies = 51 (22 - 87)
- Shifts per study = 3 (range: 1-9, mode: 2)
- Cost per enrollee: \$10.59 (\$2.32 - \$39.41)

D2D Calendar

- Fall: RFA release, billing, feedback, reporting, promotions, fundraising
 - Winter: Application review & selection
 - Spring: Kick Off Meeting, shift scheduling, staffing, IRB submissions
 - Summer: Open houses, resource procurement, building set up, Fair!
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August 22 - Sept. 2, 2024

See you at the Fair!



Photo credit Erin Benner

D2D is one of the gems of the University. Not only does it support the U's research endeavor, it provides an opportunity for the people of Minnesota to reach out and touch the University in a unique way. The people-to-people aspect of the building serves to humanize the University's research as well as the institution itself.

– 2019 D2D participant

D2D Research Publications, 2016-Present

PEER-REVIEWED PUBLICATIONS

1. Allen, J., Zhang, L., Johnson, A., Jacobson, P., McCarty, C., Pittenger, A., & Bishop, J. (2022). Development and validation of the Minnesota Assessment of Pharmacogenomic Literacy. *Journal of Personalized Medicine* 12(1398). doi.org/10.3390/jpm12091398
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11. Byiers, B., Merbler, A., Barney, C., Frenn, K., Panoskaltis-Mortari, A., Ehrhardt, M., Feyma, T...& Symons, F. (2020). Evidence of altered salivary cytokine concentrations in Rett syndrome and associations with clinical severity. *Brain, Behavior, & Immunity – Health*, 1, <https://doi.org/10.1016/j.bbih.2019.100008>
12. Calabrese, A., Cheong, A., Cheung, S., He, Y., Kwon, M. Mansfield, J., Subramanian, A., Yu, D. & Legge, G. (2016). Baseline MNREAD measures of normally sighted subjects from childhood to old age. *Investigative Ophthalmology & Visual Science*, 57, 3836-3843. <http://iovs.arvojournals.org/article.aspx?articleid=2537421>
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MANUSCRIPTS IN REVIEW

1. Eisenberg, M., Oliphant, J., Plowman, S., Forstie, M. & Sieving R. Increased parent support for comprehensive sexuality education over 15 years. *Journal of Adolescent Health*, in press.
2. Park, H. In Review at RI: Small: High Fidelity Social Signal Reconstruction in Daily Living Space NSF Robust Intelligence (IIS) Core Program.

STUDENT DISSERTATIONS, THESES & POSTERS

1. Carlson, C. (2020). Toxins Produced by *Staphylococcus aureus*. Concordia University, St. Paul Research & Scholarship Symposium, Spring 2020.
2. Castillo Jimenez, A. (2020). Identification of *Staphylococcus aureus* in State Fair Samples. Concordia University, St. Paul Research & Scholarship Symposium, Spring 2020.
3. Desai, P. (2020). What Women Want. Doctoral Thesis in Health Policy & Management. Mary Butler, Academic Advisor.
4. Duseroth, V. (2019). Consumer Behavior and Environmental Policy: Applications to Issues in Food Waste and Organics Recycling. Doctoral Thesis. Retrieved from the University of Minnesota Digital Conservancy, <http://hdl.handle.net/11299/206671>.
5. Firestone, M. (2020). Restaurants and Salmonella: Using surveillance data to improve policy development for the enhancement of food safety. Doctoral Thesis in Environmental Health Sciences. Craig Hedberg, Academic Advisor.
6. Haechten, T. (2020). *Staphylococcus aureus* Enterotoxins Presence from Samples Obtained from the Local Community. Concordia University, St. Paul Research & Scholarship Symposium, Spring 2020.
7. Holst-Wolf, J. (2018). Characterizing Proprioceptive and Haptic Function in Typically Developing Children and Individuals with Chemotherapy-related Somatosensory Impairment. Doctoral Thesis. Retrieved from the University of Minnesota Digital Conservancy, <http://hdl.handle.net/11299/209079>.
8. Huang, T. (2020). Comparing Comprehension of Indirect Answers by Children with Autism Spectrum Disorder to Children with Typical Development. Doctoral Thesis.
9. Humanski, J. (2017). A Novel Approach to Screening for Familial Hypercholesterolemia in a Large Public Venue. Master's Thesis.
10. Kabage, A. (2013). Genetics-Based Research at the Minnesota State Fair: the Impacts of Public Engagement on Participatory Experience. Master's Thesis. Retrieved from the University of Minnesota Libraries Digital Conservancy, <http://hdl.handle.net/11299/165517>
11. Kriese, A. (2019). Examination of Metalinguistic Skills in 3- to 8-Year Old Children with Low Language Abilities. Master's Thesis. Lizbeth Finestack, Advisor.
12. Kriegel, A. (2018). Metalinguistic Skills of Children with Varying Language Abilities. Undergraduate Honors Thesis, Lizbeth Finestack, Advisor. Retrieved from the University of Minnesota Digital Conservancy, <http://hdl.handle.net/11299/196383>.
13. Logan, J. (2017). What Have You Heard About the Herd? A Herd Immunity and Influenza Study. Master of Public Health Thesis in Epidemiology. Nicole Basta, Committee Chair.
14. Martin, S. (2020). Production of Superantigens in *Staphylococcus aureus* from Healthy Individuals. Concordia University, St. Paul Research & Scholarship Symposium, Spring 2020.
15. Mejia, K. (2017). A Nine-Item Questionnaire for Measuring the Social Disfardance of Mediated Social Touch Technologies. Master of Science in Mechanical Engineering. Svetlana Yarosh, Advisor. Retrieved from the University of Minnesota Libraries Digital Conservancy, <https://conservancy.umn.edu/handle/11299/190590>

16. Mendoza, M. (2020). Staphylococcus aureus Carriage and Characterization from the Minnesota State Fair. Concordia University, St. Paul Research & Scholarship Symposium, Spring 2020.
17. Mohamud, M. (2020). Excitatory effects of superantigens in Staphylococcus aureus on the immune system. Concordia University, St. Paul Research & Scholarship Symposium, Spring 2020.
18. Nawshin, T. (2018). A Crossed-Disciplinary Evaluation of Parental Perceptions Surrounding Pediatric Non-Invasive Brain Stimulation Research. Master's Thesis. Bernadette Gillick, Advisor.
19. Palm, B. (2017) Metalinguistic Skills in Children with ADHD. Master's Thesis. Lizbeth Finestack, Advisor.
20. Perttu, R. (2019). Public Acceptance/Preference for Dairy Calf Housing Systems and Perceptions of Dairy Calf Welfare. Masters Thesis. Advisor: Marcia Endres. Retrieved from the University of Minnesota Libraries Digital Conservancy, <http://hdl.handle.net/11299/208950>.
21. Price, K. (2018). Iron Deficiency, Depression, and Other Affective Disorders in Female State Fair Attendees. Master's Thesis. Daniel Gallaher, Advisor.
22. Ruprecht, M. (2016). The Determination of an Effective Smile. Department of Psychology and School of Statistics. Nathaniel Helwig, Advisor.
23. Saykao, S. (2016). Knowledge, Attitudes, and Beliefs of Agritourism and Zoonotic Diseases among Minnesota State Fair Attendees, 2016. Master's Thesis. Completed in collaboration with Carrie Klumb and Dr. Stacy Holzbauer, Minnesota Department of Health.
24. Schellinger, S. (2015). Public Perceptions of Traumatic Brain Injury: Knowledge, Attitudes, and the Impact of Education. Doctoral Thesis. Retrieved from the University of Minnesota Digital Conservancy, <http://hdl.handle.net/11299/175326>.
25. Schroepfer, K. (2019). New Form for your Newborn: Investigating the Public's Comprehension of and Preference for Newborn Screening Report Formats. Master's Thesis.
26. Seifert, E. (2020). A Comparison and Validation of Traditional and Three-Dimensional Anthropometric Methods for Measuring the Hand through Reliability, Precision, and Visual Analysis. Masters Thesis. Retrieved from the University of Minnesota Libraries Digital Conservancy, <https://conservancy.umn.edu/handle/11299/219394>.
27. Seiffert, D. (2015-16). Investigating the Public's Views of Actionability Based on Whole Genome Sequencing Results. Master's Thesis.
28. Senkow, T. (2020). The Pacinian Corpuscle and Vibrotactile Sensing in Dupuytren Disease. Doctoral Thesis in Biomedical Engineering. Victor Barocas, Academic Advisor.
29. Sohre, N., Adeagbo, M., Guy, S. (2017). Data-Driven Variation for Virtual Facial Expressions. Department of Computer Science & Engineering. Technical Report.
30. Zahid, A. (2017). Promotion of healthy beverage practices by parents of children (6-12 years). University of Minnesota Dissertation. Retrieved from the University of Minnesota Libraries Digital Conservancy, <https://conservancy.umn.edu/handle/11299/191450>.
31. Zhou, L. (2016). Food Sharing and Consumption in an Unstructured Eating Environment. University of Minnesota Undergraduate Honors Thesis in Psychology. Retrieved from the University of Minnesota Libraries Digital Conservancy, <http://hdl.handle.net/11299/181421>.
32. Zhou, X. (2019). Construction and Cross-Cultural Validation of Parenting Regulatory Focus Scale. Doctor of Philosophy Requirement. Richard Lee, Advisor. Retrieved from the University of Minnesota Digital Conservancy, https://conservancy.umn.edu/bitstream/handle/11299/209036/Zhou_umn_0130E_20601.pdf?sequence=1&isAllowed=y.

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Principal Investigator Affiliation, 2014-2023

HEALTH SCIENCES COLLEGE/SCHOOL	DEPARTMENT/DIVISION
Center for Allied Health Programs	Program in Occupational Therapy
College of Veterinary Medicine	Veterinary Population Medicine
College of Pharmacy	Experimental & Clinical Pharmacology Medicinal Chemistry Pharmaceutical Care & Health Systems Pharmacy Practice & Pharmaceutical Sciences
Medical School	Anesthesiology Center for Resuscitation Medicine Child & Adolescent Psychiatry Communicative Disorders Dermatology Developmental-Behavioral Pediatrics Duluth: Family Medicine & Biobehavioral Health Emergency Medicine Family Medicine & Community Health Laboratory Medicine & Pathology Medicine <ul style="list-style-type: none"> - Cardiology - Diabetes, Endocrinology & Metabolism - Gastroenterology, Hepatology & Nutrition - Hospital Medicine - Rheumatic & Autoimmune Diseases Neurology Neurosurgery Obstetrics, Gynecology & Women's Health <ul style="list-style-type: none"> - Gynecologic Oncology Ophthalmology & Visual Neurosciences Orthopedic Surgery Otolaryngology Pediatrics <ul style="list-style-type: none"> - Endocrinology - Epidemiology & Clinical Research - General Pediatrics & Adolescent Health - Hospital Medicine Psychiatry & Behavioral Sciences <ul style="list-style-type: none"> - Child & Adolescent Mental Health Radiation Oncology Rehabilitation Medicine <ul style="list-style-type: none"> - Physical Therapy - Rehabilitation Medicine Urology
Office of Academic Clinical Affairs	Clinical Translational Science Institute Masonic Cancer Center
School of Dentistry	Primary Dental Care <ul style="list-style-type: none"> - Community Outreach & Engagement - Dental Hygiene

School of Nursing	Adult & Gerontological Health Cooperative Center for Spirituality & Healing Child & Family Health Cooperative Population & Health Systems Cooperative
School of Public Health	Environmental Health Sciences Epidemiology & Community Health Health Policy & Management

NON-HEALTH SCIENCES COLLEGE/SCHOOL	DEPARTMENT/DIVISION
Carlson School of Management	Applied Economics Behavioral Labs Marketing
College of Biological Sciences	Biochemistry, Molecular Biology & Biophysics Biotechnology Institute Ecology, Evolution & Behavior Genetics, Cell Biology & Development
College of Design	Design, Housing & Apparel
College of Education & Human Development	Educational Psychology Family Social Science Institute of Child Development Institute on Community Integration - TeleOutreach Center Institute for Translational Research in Children's Mental Health Kinesiology Social Work
College of Extension	Family, Health & Wellbeing
College of Food, Agricultural & Natural Resource Sciences	Animal Science Applied Economics Entomology Fisheries, Wildlife & Conservation Biology Food Science & Nutrition Soil, Water & Climate
College of Liberal Arts	Economics Geography, Urban, Environment & Sustainability Studies Hubbard School of Journalism & Mass Communication Psychology Speech-Language-Hearing Sciences
College of Science & Engineering	Biomedical Engineering Chemistry Computer Science & Engineering Mechanical Engineering
Food Protection & Defense Institute	Food Protection & Defense Institute
Human Research Protections Program	Community Oversight Board
Humphrey School of Public Affairs	Leadership & Management Transportation Studies Urban & Regional Planning
Law School	Law - Robina Institute of Criminal Law & Criminal Justice
University Libraries	Bio-Medical Library

UMN SYSTEM REPRESENTATION	COLLEGE/DEPARTMENT/DIVISION
Crookston	Math, Science & Technology
Duluth	Communication Sciences & Disorders College of Education & Human Service Professions <ul style="list-style-type: none"> - Psychology College of Pharmacy <ul style="list-style-type: none"> - Pharmacy Practice & Pharmaceutical Sciences College of Science & Engineering <ul style="list-style-type: none"> - Mechanical & Industrial Engineering Foreign Languages & Literatures Geography, Urban, Environment & Sustainability Studies Medical School <ul style="list-style-type: none"> - Biobehavioral Health
Morris	Humanities <ul style="list-style-type: none"> - Communication, Media & Rhetoric Political Science
Rochester	Center for Learning Innovation

EXTERNAL RESEARCH TEAMS	COLLEGE/DEPARTMENT/DIVISION
College of St. Benedict/St. John's University	Biology Exercise Science & Sport Studies
College of St. Scholastica	Physical Therapy
Concordia University	Department of Science Physical Therapy
Fairview Medical Group	Fairview Medical Group
Hamline University	School of Business
Hennepin County Medical Center	Laboratory Medicine & Pathology
Mayo Clinic	Community Engagement in Research Program
Minneapolis Veterans Affairs Healthcare System	Center for Chronic Disease Outcomes Research
Minnesota Department of Health	Minnesota Department of Health
Minnesota State University – Mankato	College of Business <ul style="list-style-type: none"> - Management Communication Studies
Simmons University	School of Social Work
St. Catherine University	Political Science

