CMTA

Charcot-Marie-Tooth Association

ACCELERATING FORWARD

2023

ANNUAL REPORT

Dear CMTA Family,

Sue Bruhn, PhD
CHIEF EXECUTIVE OFFICER

Gilles Bouchard
CHAIRMAN OF THE BOARD

Reflecting on 2023, we are filled with immense pride and gratitude for our community's remarkable strides. This past year has been a testament to the power of unity, community, innovation, and an unwavering commitment to improving the lives of those affected by CMT.

Our financial performance in 2023 was outstanding, with total revenue reaching just over $6,000,000. This incredible support underscores the trust and value our donors place on our mission to advance research, provide community support, and ensure the responsible stewardship of funds. We are proud to share that 90 cents of every dollar spent in 2023 was directed to our mission. Charity Navigator awarded CMTA its coveted perfect 100% rating for the fourth year. This rare achievement underscores our dedication to stewarding donor contributions with care, ensuring every dollar is maximized to advance our mission while upholding the highest financial integrity and transparency standards.

Since the inception of our Strategy To Accelerate Research (STAR) program in 2008, we have invested $29.6 million in CMT research, with nearly $4.3 million in research spending in 2023 alone. We supported 50 active research projects and forged new partnerships with leading academic institutions, clinical centers, and biotech companies worldwide.

CMTA-STAR made substantial progress, including significant advancements in genetic therapy approaches covering different delivery technologies and investments in new innovative small molecule therapies. We also continued to develop CMT preclinical models to accelerate testing new therapies for CMT. We saw groundbreaking developments, such as the first clinical trial using MRI fat fraction as a primary outcome measure, thanks to the biomarkers developed in part with previous CMTA funding. Additionally, funding initiatives that led to the discovery of four new CMT genes opened new pathways for diagnosis and targeted treatments, expanding on the 2020 CMTA-funded CMT-SORD discovery, which continued through 2023 in CMTA-STAR Alliance Partner Applied Therapeutics' Phase III clinical trial.

Our community outreach programs experienced tremendous growth in 2023. The COMPASS program for young adults expanded significantly, fostering a sense of community and laying the groundwork for future initiatives. Our youth programs, including Camp Footprint, saw increased participation, bringing hope and joy to many young people and their families. We also expanded our Centers of Excellence network to 55 locations, ensuring more community members can access top-tier multidisciplinary care and resources.

In 2023, our Patients as Partners in Research platform grew to almost 6,400 participants; because of the willingness of the CMT community to volunteer and become patient partners, we have now supported over 22 studies since the program's launch in 2018. This program continues to enhance the relevance and impact of our research efforts and ensure patients remain at the center of developing new treatments for CMT.

We are incredibly and deeply grateful for our volunteers' dedication, our donors' generosity, and our community members' resilience and participation. Together, we are transforming challenges into opportunities and profoundly impacting the lives of those affected by CMT.

As we look ahead to 2024, we are excited to build on this momentum. We remain committed to our mission of supporting the development of new treatments for CMT, improving the quality of life for those with CMT, and ultimately finding a cure. Your support, passion, and commitment are the heart of our success.

Together, there is no challenge too great, no obstacle too daunting. Together, we will continue to make history, driving progress and transforming the landscape of CMT. Together, we will make CMT a thing of the past.

With warmest regards,

Sue Bruhn, PhD
Chief Executive Officer

Gilles Bouchard
Chairman of the Board

SUE BRUHN AT THE FOREFRONT: EMPOWERING CMTA'S COMMUNITY-DRIVEN IMPACT

In November 2023, CMTA ushered in a new era of leadership by appointing Suzanne (Sue) Bruhn, PhD, as our Chief Executive Officer. With over 25 years of biopharmaceutical experience and a proven track record in developing and commercializing treatments for rare diseases, Sue's leadership marks a pivotal moment in our journey towards finding a cure for CMT.

Sue brings a wealth of expertise to CMTA, having served as CEO of three biotech companies focused on rare diseases. Her extensive background in patient-focused drug development and her commitment to the patient community aligns perfectly with CMTA's mission to support the development of new treatments for CMT, to improve the quality of life for people with CMT, and, ultimately, to find a cure. Sue's visionary leadership and strategic insight are already driving our research efforts and community initiatives to new heights.

A LEGACY OF IMPACTFUL LEADERSHIP

Sue joins CMTA at a time of significant momentum. Our Strategy To Accelerate Research (STAR) program made remarkable strides in 2023, with groundbreaking advancements in gene therapy, small molecule therapy, and the development of new CMT models for preclinical testing. Under Sue's leadership, we are building on these successes and driving even more impactful research initiatives.

STRENGTHENING THE COMMUNITY

Sue's appointment is not just about leadership at the top; it's about strengthening the entire CMT community. Her approach emphasizes collaboration, innovation, and a deep commitment to the needs of the CMT community. Sue's vision includes expanding CMTA's community outreach efforts, enhancing patient support programs, and fostering partnerships with leading academic institutions, clinical centers, and biotech companies worldwide.

"Sue's deep expertise and dedication to the rare disease community are perfectly aligned with CMTA's mission," says Gilles Bouchard, Chairman of the Board. "Her leadership will be instrumental in advancing our efforts and driving us towards achieving our goals. We are excited to have her at the helm during this exciting time."

A PROVEN LEADER IN BIOTECH

Sue's career is distinguished by her significant drug development and commercialization achievements, and she has seen multiple rare disease products advance from research through clinical development and launch onto the commercial market. Her experience in raising capital, business development, and strategy, combined with a deep network in the biopharmaceutical space, makes her an invaluable asset to CMTA.

"I am incredibly excited to join CMTA, the world's largest philanthropic funder of CMT research," says Sue Bruhn. "I have spent my career on patient-focused drug development and believe deeply in the power of community. I am committed to working with the CMT community and all of our partners to accelerate the pathway to a cure."

LOOKING AHEAD

As we look ahead to 2024, Sue's leadership promises to usher in a new era of growth and progress for CMTA. We are excited about her expertise in furthering our mission and bringing us closer to a world without CMT. We invite all members of the CMTA family to join us in welcoming Sue.

2023: A YEAR OF GROWTH AND COMMUNITY IMPACT

As we look back on 2023, CMTA's Community Outreach Department is filled with pride and gratitude for the remarkable strides our dedicated and passionate community made possible. This past year is a testament to the power of unity, community, and unwavering commitment to addressing the needs of today while laying the groundwork for hope and progress tomorrow. The stories and milestones of 2023 highlight our collective efforts to create a supportive, informed, and empowered CMT community.

YOUTH PROGRAMS AND CAMP FOOTPRINT: LASTING IMPACT

This year, our youth programs flourished, bringing together young people nationwide to connect, learn, and support each other. Camp Footprint continued as a beacon of hope and joy, seeing increased participation with 61 campers and 49 staff members in the West, and 80 campers with 69 staff members in the East—a 23% increase over 2022. Our youth database grew from 261 in 2022 to 323 in 2023, showing our programs' expanding reach and impact.

Our Youth Council continued to shine, organizing impactful outings and community get-togethers like the memorable youth council retreat in Washington. The third annual Dance4CMT was a highlight, alongside regional youth outings in Dallas, Minneapolis, and Boston. The CMTA SWAG Store and the holiday postcards sent to all CMTA youth added a personal touch, fostering a sense of belonging and community and letting our youth know they are not alone.

SUNSHINE IN A BOX

Finding out you have CMT as a child can be a challenging adjustment, and facing surgery due to CMT can add to that challenge. To bring hope and support in these situations, the CMTA Youth Council launched the Boxes of Sunshine project in 2023. These thoughtful packages, designed for newly diagnosed youth or youth preparing for CMT-related surgery, are filled with love, advice, and inspiration.

COMPASS Members

COMPASS AND ITS IMPACT

COMPASS, our young adult program for 19 to 30-year-olds, experienced a surge in engagement, with active participation jumping from 60 in July 2023 to 143 by year's end, growing nearly 140%! Monthly meetings fostered a sense of community and laid the groundwork for future initiatives. Committees for social media engagement, special projects, fundraising, and content for The CMTA Report began to take shape, ensuring that our young adults remain at the forefront of our efforts.

CONTINUED ON PAGE 4

2023 Summit Youth Outing

ADDRESSING THE NEEDS OF OUR YOUNGER COMMUNITY MEMBERS WAS A KEY FOCUS IN 2023

COMMUNITY PROGRAMS

The expansion of our community programs was nothing short of extraordinary. We welcomed ten new branches across North America, from Edmonton, Alberta, to Central Virginia, reflecting the growing demand for local support and resources. Our branches held 76 meetings, each one a testament to the strength and resilience of our community.

Sue Bruhn with Community Member and Summit Steering Committee Member Bruce Egnew

Education remained a cornerstone of our outreach efforts. The Patient & Research Summit in Boston was our first in-person Summit since COVID-19 and was held in a hybrid format that offered online participation. As a testament to the program's value, we attracted 240 in-person attendees and 364 virtual participants. Our quarterly "Lunch & Learn" webinar series reached a total attendance of 612, covering essential topics impacting our community's daily lives, such as nutrition, neurotoxic medications, and much more.

The Gladstones Institutes Education Meeting and Lab Tour, hosted by CMTA Strategy To Accelerate (STAR) Scientific Advisory Board member Bruce Conklin, MD, offered a unique opportunity for 68 attendees to engage with top scientists and witness firsthand the advances in CMT gene editing research.

Our Centers of Excellence (COE) network grew to 55 locations, adding new centers in cities like Seattle, Hershey, and San Francisco. With 9,000 patient visits in 2023, the ever-expanding CMTA Centers of Excellence network ensures more community members have access to top-tier care and resources.

LOOKING AHEAD

Reflecting on this past year, we are reminded that every step forward is a collective effort. The growth and success of our programs are driven by the dedication of our volunteers, our donors' generosity, and our community members' resilience. Together, we are making a profound impact, transforming challenges into opportunities, and bringing hope to countless lives.

Gladstone Institutes Lab Tour

Leadership

BOARD OF DIRECTORS

The Board of Directors brings a unique blend of professional expertise and personal dedication to governing CMTA activities. Comprised of business owners, managers, doctors, lawyers, and public servants, they possess the skills necessary to oversee the organization's operations and strategize its efforts in funding research and finding a cure. Their connection to CMT, either as individuals affected by the disease or as close loved ones, fuels their unwavering commitment to helping those impacted by CMT. In 2023, their collective contributions totaled $718,000 to support CMTA's mission.

Gilles Bouchard, *Chairman*
Kevin Sami, *Treasurer*
Herb Beron, *Secretary*
David Apple
Wendy Arnone
Dan Chamby
David Coldiron
Bernard Coulie, MD, PhD
Thomas W. Dubensky Jr., PhD
Gary Gasper
Kevin Marks
David Norcom
Steven O'Donnel
Jon Pastor
Steven Scherer, MD, PhD
Michael Shy, MD
John Svaren, PhD
Patricia Verduin, PhD
Craig Zeltsar

Special Advisors to the Board
Alan Korowitz
Elizabeth Oullette
Phyllis Sanders
Bruce Chizen

ADVISORY BOARD

Because patient advocacy is one of the missions of CMTA, the CMTA Board of Directors created an advisory board whose members offer insights and guidance with some of the important, but not always medical, issues facing people with CMT. CMTA Advisory Board members are CMT experts from various backgrounds and are happy to assist community members with questions in areas of their expertise.

Gregory Carter, MD, MS
Ken Cornell, CO
Bob DeRosa
Katy Eichinger, PT, DPT, NCS
Ashraf Elsayegh, MD, FCCP
Tim Estilow, OTR/L
Shawna Feely, MS, CGC
Valery Hanks, OTR/L, C/NDT
Sarah Kesty
Kate Lair
Bethany Noelle Meloche
Tom Meloche
David Misener, BSc (HK), CPO, MBA
Elizabeth Misener, PhD, LMSW
Christine Murray, MD
John Nixon
Sabrina Paganoni, MD, PhD
Glenn Pfeffer, MD
Clark Semmes
Carly Siskind, MS, CGC
Greg Stilwell, DPM
Patricia Sciscione, PhD, RN, CSN-NJ
David Tannenbaum, LCSW

CMTA STAFF

Sue Bruhn, PhD
Chief Executive Officer
sue@cmtausa.org

Katherine Forsey, PhD
Chief Research Officer
katherine@cmtausa.org

Kim Magee
Director of Finance and Administration
kim@cmtausa.org

Jeana Sweeney
Chief Engagement and Gift Officer
jeana@cmtausa.org

Laurel Richardson
Director of Community Outreach
laurel@cmtausa.org

Chris Cosentino
Director of Marketing
chris@cmta.usa.org

Sarah Gentry, MS
Director of Technology
sarah@cmtausa.org

Sarah Kaider
Digital Marketing Manager
sarahk@cmtausa.org

Jonah Berger
National Youth Programs Manager
jonah@cmtausa.org

Kenny Raymond
Head of Communications
kenny@cmtausa.org

FUNDRAISING:

ACCELERATING RESEARCH AND CHANGING LIVES

In 2023, CMTA experienced an extraordinary year marked by significant growth, profound generosity, and meaningful impact. Our dedicated community of donors, volunteers, and supporters rallied together, raising critically needed funds and driving our commitment to accelerate research, provide critical patient support, and change lives.

LEGACY SOCIETY: CELEBRATING GENEROSITY AND IMPACT

In 2023, CMTA's Legacy Society witnessed extraordinary generosity, with contributions totaling $1,366,000. The CMTA Legacy Society is a distinguished group dedicated to making a lasting impact in the fight against CMT. These donors exemplify true philanthropic spirit by including CMTA in their estate plans. Their decision to leave a legacy that leaves an indelible mark on the world is instrumental in our continued progress.

YEAR-END APPEAL: DRIVING PROGRESS AND HOPE

CMTA's end-of-year giving campaign captured the hearts and minds of our community in 2023, raising a record $668,000. The success of the 2023 year-end appeal is a testament to the power of unity in the community and the impact we can achieve together.

INNERVATORS: DRIVING CHANGE THROUGH MONTHLY GIVING

INNERVATORS are action-oriented game-changers who sustain CMTA with monthly gifts throughout the year. Their steady and reliable support is crucial for life-changing initiatives.

Board Member David Coldiron and Family

CMTA'S LEGACY SOCIETY RAISED MORE THAN $1.3 MILLION IN 2023

In 2023, INNERVATORS saw significant growth and impact, with contributions totaling $144,000, an increase of almost $20,000 from 2022. The community's generosity fosters a shared purpose and collective impact that changes lives.

CMTA BOARD OF DIRECTORS: LEADING THROUGH GIVING

In 2023, CMTA's Board of Directors demonstrated remarkable leadership and dedication, raising $718,000 through individual contributions and special event fundraisers such as Team Julia and the Coldiron Derby. These efforts highlight the Board's commitment to advancing research, supporting the CMT community, and driving progress towards treatments and a cure.

Board Member David Coldiron's Coldiron Derby raised $65,000. The Kentucky Derby-themed event featured live music, fabulous food, Derby viewing, live and silent auctions, and a bourbon tasting, bringing the community together for a memorable and impactful evening.

Board Treasurer Herb Beron's Team Julia swim, dedicated to his daughter, raised $46,000. This fundraiser exemplifies the personal dedication and community spirit that drives CMTA forward. We celebrate and sincerely appreciate our Board members' steadfast support and commitment. Their leadership and generosity are vital to our continued success and drive to change the lives of people living with CMT.

CONTINUED ON PAGE 8

Board Secretary, Herb Beron

WALK AND CYCLE 4 CMT: A COMMUNITY IN MOTION


The Fernandes Family

In 2023, dedicated community members across the US participated in CMTA's Walk and Cycle 4 CMT events throughout the year, raising more than $326,000. These annual community-based fundraising events have continued for over a decade, bringing together the CMT community to raise awareness about CMT and generate much-needed funds for research and community programs.


Walk 4 CMT Participant Family


Patient Support Fund Recipient

CMTA PATIENT SUPPORT FUND: BRINGING ACCESS TO ESSENTIAL CARE

In 2023, CMTA's Patient Support Fund continued to provide crucial financial assistance to CMT community members, thanks to the generous support of a community donor. This fund ensures that patients in need can access top-tier corrective foot surgical care at Cedars-Sinai Medical Center, a CMTA-designated Center of Excellence known for its exceptional surgical team.

The Patient Support Fund is designed to support CMT community members seeking corrective foot surgery with Glenn B. Pfeffer, MD, at Cedars-Sinai Medical Center in Los Angeles, CA, and each patient can receive up to $5,000 in financial support, helping to cover travel costs for up to two people for pre-op consultations and surgery.

DRIVING IMPACT

Reflecting on 2023, we are immensely grateful for our community's unwavering support and dedication. Your continued generosity and commitment foster hope, transform lives, and pave the way for a brighter future for all affected by CMT.

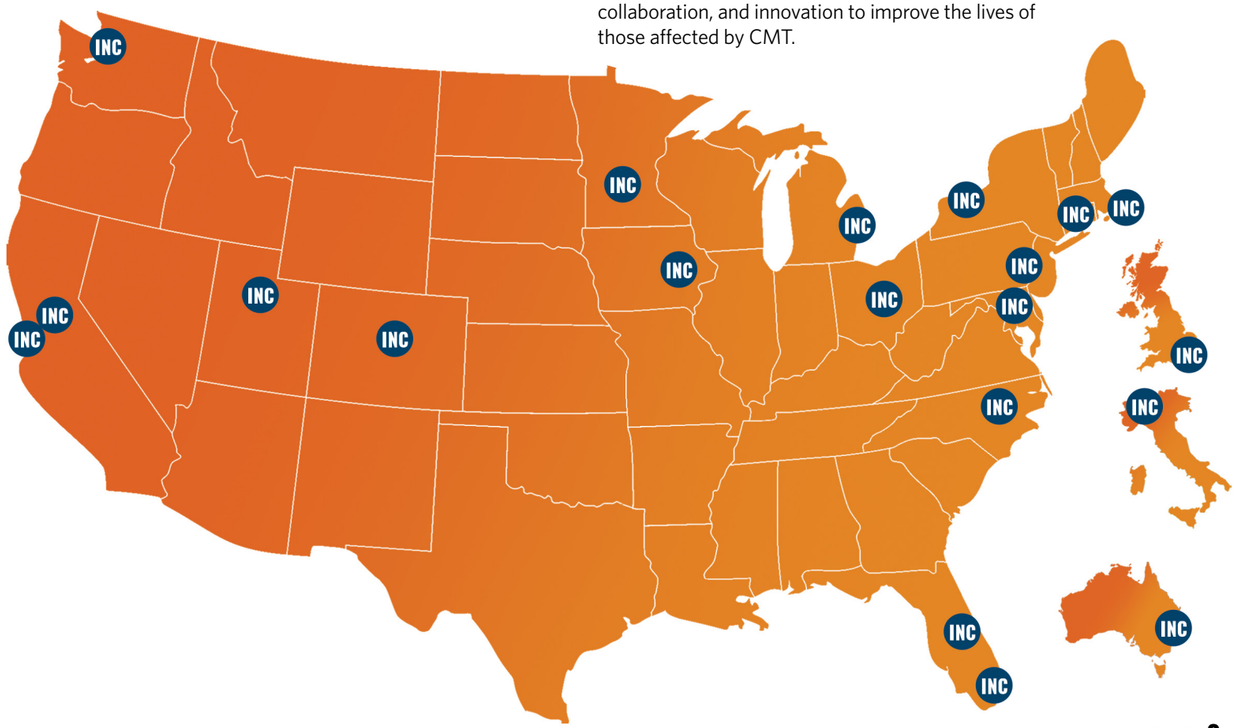
THE INHERITED NEUROPATHY CONSORTIUM AND ITS IMPACT ON THE CMT COMMUNITY

The Inherited Neuropathy Consortium (INC) stands as a beacon of hope and progress for those affected by CMT. As an integrated international group of 20 academic CMT-focused medical clinics and clinical research resources, INC is dedicated to advancing clinical research and improving patient care for all who have CMT. Notably, all 20 INC sites are also CMTA Centers of Excellence.

Funded by the National Institutes of Health (NIH), with financial support from CMTA, INC is dedicated to clinical trial readiness for all CMT subtypes. In 2023, CMTA continued its robust support of INC through a three-year grant awarded in 2022 to enhance patient care and clinical trial preparedness. This grant facilitated longitudinal studies of the natural history of progression and the further development of critical outcome measures and biomarkers while providing vital support for training full-time clinicians, postdoctoral fellows, and other students passionate about CMT research. The grant also led to INC discovering several new CMT genes, bringing hope for the large proportion of our community who cannot yet obtain a genetic confirmation.

ACCELERATING FORWARD

Looking forward, CMTA remains steadfast in its commitment to partnering with INC. The impact of INC's work on the CMT community continues to drive progress, harnessing the power of research, collaboration, and innovation to improve the lives of those affected by CMT.



STAR Advisory Board Chairperson John Svaren, PhD, in his Laboratory

2023 STAR PROGRAM: ACCELERATING RESEARCH AND EMPOWERING PATIENTS

CMTA's Strategy To Accelerate Research (STAR) continued to demonstrate our incredible impact on the development of new treatments for CMT in 2023, underscoring our ultimate mission to find a cure. Our achievements were driven by robust collaborations across a network of scientific researchers, clinicians, community members, and BioPharma companies (known as CMTA-STAR Alliance Partners), significantly advancing our understanding of CMT and accelerating progress towards effective treatments. In total, there were 50 active CMT research projects in 2023.

Since funding the discovery of the first CMT-causing gene in 1991 and continuing in 2023 with discovering four new genes through our ongoing work with GENESIS and the Inherited Neuropathy Consortium (INC), CMTA remains dedicated to uncovering all of CMT's genetic causes. By identifying these disease genes, researchers can develop more precise diagnostic tools, improving early detection and patient outcomes to address the needs of more than 40% of our community who cannot yet obtain genetic confirmation of the cause of their CMT.

With $4.3 million spent on CMTA-STAR research in 2023, our projects cover a broad spectrum of therapeutic approaches for many types of CMT. These initiatives incorporated several new delivery technologies and supported the entire development pipeline, from basic research to preclinical testing to clinical trials. STAR Alliance Partner Applied Therapeutics' ongoing Phase III clinical trial for CMT-SORD (the INSPIRE trial) and University College London's Phase II trial for HSN-1 (the SENSE trial) are direct results of CMTA's sustained commitment to clinical trial readiness and the development of functional outcome measures and biomarkers, which are critical to accelerating drug development.

In addition to our ongoing initiatives, 2023 marked the completion of eight sponsored research projects, significantly advancing our understanding and treatment of various CMT subtypes. These projects, representing substantial investments, encompass a range of therapeutic approaches and delivery methods. Highlights include groundbreaking work on axonal degeneration in late-onset CMT1B, the development of gene therapy strategies for CMT2E, and efforts to stop axonal degeneration across multiple subtypes. Several of these completed projects provided critical insights and laid the groundwork for new research, driving our mission forward and strengthening our commitment to improving the lives of those affected by CMT. Lessons learned from one type of CMT support progress in other types.

PATIENTS AS PARTNERS IN RESEARCH

CMTA-STAR's 2023 impact reached the CMT community through our Patients as Partners in Research platform. With this platform, CMTA connects patients with research participation opportunities, enhancing the relevance and applicability of our studies. The platform expanded to almost 6,400 community members in 2023, marking an 8.8% increase from 2022. Its global reach underscored its significance, with participants worldwide representing 47 types of CMT.

Supporting over 22 projects since its launch in 2018, the Patients as Partners in Research platform improved our understanding of CMT subtype distribution. Participants participated in focus groups to help researchers better understand disease burden. The platform also accelerated recruitment for clinical trials and critically needed natural history studies. The active involvement of our community through the Patients as Partners in Research platform is crucial—research cannot advance without the community at its core.

SPONSORED RESEARCH PROJECTS

In 2023, nine new sponsored research projects were approved by CMTA's Board of Directors, involving 14 institutions across four countries, with a total project value of $3.1 million. These projects encompass diverse therapeutic approaches, including genetic therapies, repurposing existing drugs, and more. Notable advancements include cutting-edge CRISPR-Cas9 gene editing, AAV genetic therapies, and advanced CMT laboratory models. These initiatives aim to address many types of CMT and bring effective treatments to patients.

The new projects approved in 2023 cover both axonal and demyelinating types of CMT, including treatment approaches applicable to multiple types, showcasing CMTA's commitment to comprehensive research benefiting the entire CMT community. A significant milestone was initiating the first clinical trial using Magnetic Resonance Imaging (MRI) to measure fat in the calf muscle as a primary outcome measure. This exciting new biomarker, developed with previous CMTA funding, underscores our dedication to developing the tools needed for measuring successful clinical trial outcomes in the shortest possible time, no small feat in what can be a slowly progressive disease.

In addition to launching new projects, our ongoing sponsored research efforts yielded significant advancements. Among the 31 active projects, we made remarkable progress in several key areas. These projects are broadening our understanding of CMT's natural history, advancing biomarker studies, and driving the discovery of new genes, further enhancing the precision of diagnostic tools and treatment strategies.

The extensive scope and scale of CMTA-STAR's sponsored research highlights our dedication to exploring all potential avenues for treatment, all aspects of every stage of the drug development landscape, including clinical trial readiness, and improving the lives of those affected by CMT.

CONTINUED ON PAGE 13

2023 STAR Advisors

CMTA'S STRATEGY TO ACCELERATE RESEARCH ADVISORY BOARD

is overseen by Katherine Forsey, PhD, CMTA's Chief Research Officer. It comprises a Scientific Advisory Board (SAB), a Therapy Expert Board (TEB), and a Clinical Expert Board (CEB). Each plays a critical role in furthering CMTA's mission to support the development of new treatments for CMT, to improve the quality of life for people with CMT, and ultimately to find a cure.

The SAB provides scientific input for ongoing and proposed projects, the TEB evaluates the translational quality of ongoing and proposed projects, and the CEB provides expert guidance and support to CMTA's STAR Alliance Partners regarding clinical trial planning and delivery. CMTA expanded its Advisory Board to 31 members in 2023 when it appointed Martine Garnier, PhD, to the TEB, reflecting STAR's evolving needs.

SCIENTIFIC ADVISORY BOARD

John Svaren, PhD,
Scientific Advisory Board Chair
University of Wisconsin

Frank Baas, MD, PhD
University of Amsterdam, The Netherlands

Robert Burgess, PhD
The Jackson Laboratory, Bar Harbor, Maine

Bruce Conklin, MD
University of California San Francisco

Maurizio D'Antonio, PhD
San Raffaele Scientific Institute, DIBIT, Milan, Italy

Steven Gray, PhD
University of Texas Southwestern Medical Center

Scott Harper, PhD
The Ohio State University School of Medicine

Kleopas Kleopa, MD
Cyprus Institute of Neurology & Genetics

Jun Li, MD, PhD
Houston Methodist Hospital and Weill Cornell Medical College

Rudolf Martini, PhD
University of Würzburg, Germany

Klaus-Armin Nave, PhD
Max Planck Institute of Experimental Medicine, Germany

Brian Popko, MD
University of Chicago

Mario Saporta, MD, PhD
University of Miami

Stephan Züchner, MD, PhD
University of Miami

THERAPY EXPERT BOARD

Mark Scheideler, PhD, *Therapy Expert Board Chair*
HumanFirst Therapeutics LLC

Martine Garnier, PhD
MG Pharma Consulting

Tage Honoré, PhD
Aestus Therapeutics Inc.

Lars J. Knutsen, PhD
Discovery Pharma Consulting LLC, Cambridge, UK

Claes Wahlestedt, MD, PhD
University of Miami

CLINICAL EXPERT BOARD

Michael Shy, MD, *Clinical Expert Board Chair*
University of Iowa

Mary Reilly, MD, *Clinical Expert Board Co-Chair*
National Hospital for Neurology, London, UK

Diana Bharucha-Goebal, MD, PhD
Children's National Hospital Washington DC and the National Institutes of Health (NIH)

Joshua Burns, PhD
University of Sydney, Australia

Laura Feltri, MD
Research Foundation at the State University of NY

Richard Finkel, MD
St. Jude Children's Research Hospital, Memphis, Tennessee

Vera Fridman, MD
University of Colorado Anschutz Medical Campus and Hospital

David Herrmann, MD
University of Rochester

Christopher Klein, MD
Mayo Clinic, Rochester, Minnesota

Davide Pareyson, MD
Besta Institute, Milan, Italy

Steven Scherer, MD, PhD
University of Pennsylvania

2023 STAR PROGRAM CONTINUED

CLINICAL TRIAL READINESS: BIOMARKERS AND NATURAL HISTORY DATA

CMTA has positioned itself as a global leader in CMT clinical trial readiness by developing biomarkers to determine if a treatment is working and by leading CMT natural history efforts to understand better how CMT affects individuals. Throughout 2023, CMTA-funded initiatives in this area included developing and implementing wearable sensors that collect precise gait and balance data at home and in real time.

These advancements have significantly deepened our understanding of disease progression in many types of CMT, directly benefiting the CMT community. By identifying "digital biomarkers" with heightened responsiveness to change while growing natural history knowledge, we are creating new tools to assess treatment success, ultimately improving the quality of life for those affected by CMT and bringing hope for a better tomorrow.

Our investment in these advanced techniques highlights our commitment to providing the CMT community with the best resources to bring much-needed treatments.

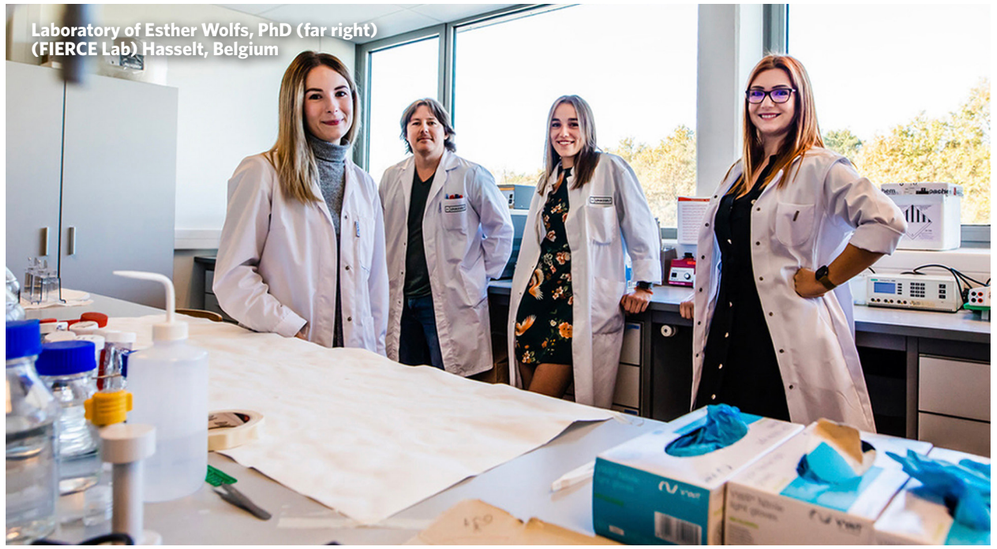
GENETIC DISCOVERY

Through STAR, CMTA's unwavering commitment to genetic research led to the 2023 discovery of four new CMT genes: COQ7, CRYAB, MYO9B, and SARS1. These discoveries broaden our understanding of the genetic basis of CMT and open new pathways for targeted treatments and therapies. This progress brings hope to the CMT community, demonstrating that continued investment in genetic research leads to significant advancements, with the CMTA-funded CMT-SORD discovery in 2020 as a notable example.

The impact of these discoveries resonates throughout the community, fostering a sense of optimism and hope that strengthens CMTA's resolve to find all genes responsible for CMT. With the emergence of encouraging genetic therapies, knowing the genetic causes of CMT has never been more critical. From the first gene to the last gene, CMTA won't stop until all community members know their gene.

COMMUNITY DRIVES PROGRESS

We are inspired by the progress made in 2023 and remain dedicated to accelerating treatments for CMT. Our 2023 achievements provide a solid foundation to build future successes, and we remain laser-focused on our mission to drive transformative research that involves the community every step of the way. Community donations fund every dollar of research. Without you, none of this would be possible. With the unending support of our community, researchers, and industry partners, we will continue making significant strides towards achieving CMTA's vision of a world without CMT.



Laboratory of Esther Wolfs, PhD (far right) (FIERCE Lab) Hasselt, Belgium

2023:

CMTA Charcot-Marie-Tooth Association | STAR Strategy To Accelerate Research

TRANSFORMING LIVES THROUGH IMPACTUL RESEARCH

Driven by our unwavering commitment, the CMTA-STAR program, along with our dedicated researchers and generous community donors, enabled significant gains in understanding and addressing the complexities of CMT. The following summaries highlight the impact of CMTA-STAR's 2023 sponsored research portfolio, showcasing our collaborative efforts to transform scientific discoveries into real impact for the CMT community.

Please visit cmtausa.org/star to learn more.

SPONSORED RESEARCH COMPLETED IN 2023

Mechanisms of Axonal Degeneration in Late-Onset CMT1B Neuropathy: Molecular Pathways and Therapeutic Approaches – Treatment Development – Small Molecule

With CMTA support of $260,243, an international team of researchers at the Research Foundation at the State University of New York in Buffalo, NY, led by the late Laura Feltri, MD, and her husband, Lawrence Wrabetz, MD, and Maurizio D'Antonio, PhD from the San Raffaele Scientific Institute in Milan, Italy identified that the positive effects of inhibiting the SARM1 enzyme in CMT2A are not also seen in CMT1B, a common demyelinating type of CMT.

IMPACT: This project showed that blocking the SARM1 enzyme does not work for all types of CMT.

Establishing Gene Therapy Strategies for CMT2E to Restore Neurofilaments to Disease Neurons – Genetic Therapy

With CMTA support of $256,036, researchers at the Ohio State University and Nationwide Children's Hospital in Columbus, OH, led by Anthony Brown, PhD, worked on a gene therapy for CMT2E.

IMPACT: Potential new gene therapy for CMT2E.

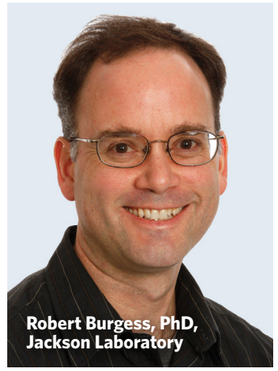
Therapeutic Inactivation of CMT2 Disease Alleles with CRISPR – Genetic Therapy

With CMTA support of $664,261, researchers at the Gladstone Institute at the University of California San Francisco, led by Bruce Conklin, MD, and Luke Judge, MD, PhD, are developing techniques to "edit out" the copy of the gene that has the CMT-causing mutation in CMT2A and CMT2E. Dr. Conklin and colleagues believe their approach could apply to many types of CMT.


Bruce Conklin, MD, UCSF

IMPACT: Potential new genetic therapy to treat several types of CMT.

Inhibition of SARM 1 in 1A, X1, 2C, 2D, 2E, 2S, 4J – Treatment Development


Robert Burgess, PhD, Jackson Laboratory

With CMTA support of $110,000, researchers at the Jackson Laboratory in Bar Harbor, ME, led by Robert Burgess, PhD, studied models for different types of CMT to see if blocking SARM1 would lead to the same benefits seen in a model of 2A. It was shown that blocking SARM1 is not an effective strategy for 1A, X1, or 4J.

IMPACT: This project showed that blocking the SARM1 enzyme does not work for all types of CMT. Plans are underway to see if this could work for other CMT types.

Improving Proteasome Function to Treat CMT 1A and 1B – Drug Repurposing


Jordan VerPlank, PhD, USUHS

With CMTA support of $204,785, a team of researchers from the Research Foundation at the State University of New York in Buffalo, NY, led by the late Laura Feltri, MD, and Jordan VerPlank, PhD, have developed an encouraging approach to potentially treat CMT1A and 1B with a combination of two drugs, one of which is already FDA-approved and is in wide use.

IMPACT: This project led to the identification of a drug candidate for Type 1 CMTs and a new CMTA-funded project (see Activating Selective Protein Degradation to Treat CMT1 Neuropathies in the Ongoing Sponsored Research Section).

CONTINUED ON PAGE 17

	STAR ALLIANCE PARTNERS	THERAPY TYPE	DRUG DEVELOPMENT STAGE
			Discovery / Research Tools / Preclinical / Phase I / Phase II / Phase III
1A	Pharnext	Small Molecule	Phase III
1A	NMD Pharma	Small Molecule	Phase II
1A	Cellatoz	Cell Therapy	Phase I
1A	Ageronix	Biological	Preclinical
1A	STAR Alliance Partner A	Small Molecule	Preclinical
1A	STAR Alliance Partner B	Genetic Therapy	Preclinical
1A	**Armatus Bio**	Genetic Therapy	Preclinical
1A	**Cyprus Institute of Neurology and Genetics**	Genetic Therapy - AAV	Preclinical
1A	**Gladstone Institutes - UCSF**	Genetic Therapy - CRISPR	Preclinical
1A	Nervosave	Genetic Therapy	Preclinical
1A	Novartis	Genetic Therapy	Preclinical
1A	Orthogonal Neuroscience	Antibody	Preclinical
1A	**Ospedale San Raffaele (OSR)**	Genetic Therapy - CRISPR	Preclinical
1A	STAR Alliance Partner I	Genetic Therapy	Preclinical
1A	STAR Alliance Partner J	Genetic Therapy	Preclinical
1A	Shift Pharmaceuticals	Genetic Therapy	Preclinical
1A	**Uniformed Services University of the Health Sciences**	Small Molecule	Preclinical
1A	**University of Rochester and INC Sites**	Biomarkers and Natural History	Preclinical
1A	**University of Texas Southwestern**	Genetic Therapy - AAV	Preclinical
1A	**University of Wisconsin - Madison**	Genetic Therapy - CRISPR	Preclinical
1A	**University of Wisconsin - Madison**	Small Molecule	Preclinical
1A	**University of Wisconsin - Madison**	Genetic Therapy - AAV	Preclinical
1A	STAR Alliance Partner E	Genetic Therapy	Preclinical - Completed
1A	**Jackson Laboratory**	SARM1/Target Validation	Preclinical - Completed
1A	**Research Foundation for the State University of New York**	Small Molecule	Preclinical - Completed
1A	STAR Alliance Partner K	Small Molecule	Preclinical - Completed
1A	Toolgen	Genetic Therapy	Preclinical - Completed
1A	**Hasselt University**	New Cell Model	Research Tools
1A	**New York STEM Cell Foundation**	Stem Cell Lines - Biobank	Research Tools
1A	**University of Antwerp**	New Organoid Model	Research Tools
1A	**University of Wisconsin - Madison**	Biomarker Discovery	Discovery
1B	NMD Pharma	Small Molecule	Phase II
1B	**Cyprus Institute of Neurology and Genetics**	Genetic Therapy - AAV	Preclinical
1B	**Gladstone Institutes - UCSF**	Genetic Therapy - CRISPR	Preclinical
1B	**Ospedale San Raffaele (OSR)**	Genetic Therapy - CRISPR	Preclinical
1B	**Ospedale San Raffaele (OSR)**	Small Molecule	Preclinical
1B	**Uniformed Services University of Health Sciences**	Small Molecule	Preclinical
1B	**University of Iowa and INC Sites**	Biomarker and Natural History	Preclinical
1B	**University of Texas Southwestern**	Genetic Therapy - AAV	Preclinical
1B	**University of Wisconsin - Madison**	Genetic Therapy - AAV	Preclinical
1B	**University of Wisconsin - Madison**	Genetic Therapy CRISPR	Preclinical
1B	**University of Wisconsin - Madison**	Small Molecule	Preclinical
1B	**Ospedale San Raffaele (OSR)**	Small Molecule	Preclinical - Completed
1B	**Research Foundation for the State University of New York**	Small Molecule	Preclinical - Completed
1B	**Research Foundation for the State University of New York**	Small Molecule	Preclinical - Completed
1B	**New York STEM Cell Foundation**	Stem Cell Lines - Biobank	Research Tools
X1 (aka 1X)	NMD Pharma	Small Molecule	Phase II
X1 (aka 1X)	**Cyprus Institute of Neurology and Genetics**	Nanoparticle Delivery System	Preclinical
X1 (aka 1X)	**Cyprus Institute of Neurology and Genetics**	Genetic Therapy - AAV	Preclinical
X1 (aka 1X)	STAR Alliance Partner J	Genetic Therapy	Preclinical
X1 (aka 1X)	**University of Iowa and INC Sites**	Biomarker and Natural History	Preclinical
X1 (aka 1X)	**University of Texas Southwestern**	Genetic Therapy - AAV	Preclinical
X1 (aka 1X)	**University of Wisconsin - Madison**	Genetic Therapy - AAV	Preclinical
X1 (aka 1X)	**Jackson Laboratory**	SARM1/Target Validation	Preclinical - Completed
X1 (aka 1X)	**Jackson Laboratory**	Metabolic Therapy	Preclinical - Completed
X1 (aka 1X)	**New York STEM Cell Foundation**	Stem Cell Lines - Biobank	Research Tools
X1 (aka 1X)	**University of Wisconsin - Madison**	Biomarker Discovery	Discovery

THIS CHART ILLUSTRATES THE PROGRESSION AND CURRENT STATUS OF CMTA-FUNDED RESEARCH PROJECTS ACROSS VARIOUS STAGES OF DEVELOPMENT, FROM DISCOVERY TO CLINICAL TRIALS. BOLD TEXT INDICATES PROJECTS DIRECTLY FUNDED BY CMTA.

CMTA-SPONSORED RESEARCH COMPLETED IN 2023

CONTINUED FROM PAGE 15

Metabolic Therapy for CMTX1 – Drug Repurposing – Metabolic Therapy

With CMTA support of $95,302, a team of researchers at the Jackson Laboratory in Bar Harbor, ME, led by Robert Burgess, PhD., and Laurent Bogdanik, PhD., treated a CMTX1 model with an FDA-approved food additive to see if it would improve CMTX1 symptoms. No significant gains were reported in overall muscle strength or sensory improvement but the team were able to develop a new model of CMTX1 as part of this study and this is now being used for further studies.

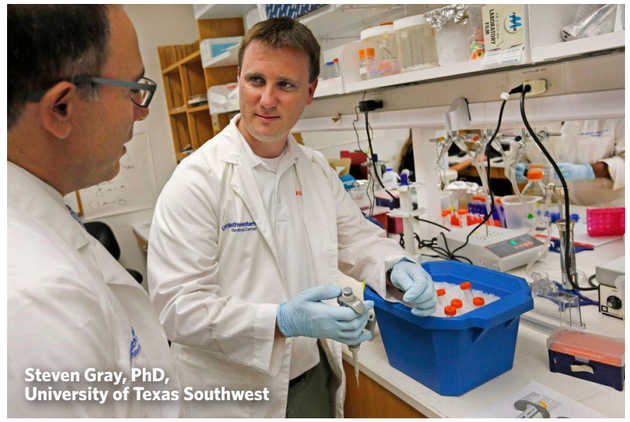
IMPACT: New CMTX1 model.

Schwann Cell-Targeted Gene Therapy Approaches to Treat CMT1A and Other Demyelinating Neuropathies – Genetic Therapy


Kleopas Kleopa, MD, Cyprus Institute

With CMTA support of $41,052, an international team of researchers, led by John Svaren, PhD at the University of Wisconsin-Madison, in Madison, WI, Steven Gray, PhD, at the University of Texas Southwest in Dallas, TX, and Kleopas Kleopa, MD, at the Cyprus Institute of Neurology and Genetics, in Nicosia, Cyprus, is developing a potential gene therapy for CMT1A.
**This project is part of an ongoing joint project. This portion was completed in 2023, but the other two are ongoing. See the project by the same title in Ongoing Sponsored Research Projects for more details, page 22.*

IMPACT: Potential new genetic therapy to treat several types of CMT.


Steven Gray, PhD, University of Texas Southwest

NEW SPONSORED RESEARCH AWARDED IN 2023

ASO Approaches for CMT2E – Treatment Development – Small Molecule

With CMTA support of $225,483, researchers at the University of Miami in Miami, FL, led by Mario Saporta, MD, PhD, are working on an approach to treat CMT2E with an antisense oligonucleotide (ASO) drug, if they are successful, the same approach could be used for other types of CMT.

IMPACT: Potential new genetic therapy to treat CMT2E.

Gene Editing Strategies for Demyelinating CMT – Genetic Therapy

With CMTA support of $448,748, an international team of researchers, led by John Svaren, PhD at the University of Wisconsin-Madison, in Madison, WI, Bruce Conklin, MD, at the Gladstone Institute at the University of California San Francisco in San Francisco, CA, and Maurizio D'Antonio, PhD, at the San Raffaele Scientific Institute in Milan, Italy, is leading a comprehensive project to develop new therapies for CMT1A and 1B using CRISPR technology.

IMPACT: Potential new genetic therapy to treat several types of CMT.

Development of a Human-Derived Myelin Containing Organoid as a Reference Model for CMT1A – Preclinical Toolbox

With CMTA support of $201,435, a team of researchers at the Peripheral Neuropathy Research Group at the University of Antwerp in Antwerp, Belgium, led by Professor Vincent Timmerman, PhD, are developing an innovative organoid model of CMT1A, the most common type of CMT.

IMPACT: An in-the-dish model to quickly evaluate potential treatments to repair parts of the nervous system damaged by CMT.

Gene Replacement Therapy for CMT4A Neuropathy – Genetic Therapy

With CMTA support of $248,900, researchers at the University of Texas Southwest in Dallas, TX, led by Steven Gray, PhD, and Xin Chen, MD, PhD, are developing a new AAV-based gene replacement therapy for CMT4A, with potential applications for other types of CMT.

IMPACT: Potential new genetic therapy to treat several types of CMT.

Metabolomic Analysis of Plasma Samples Using TMIC MEGA Assay – Clinical Trial Readiness

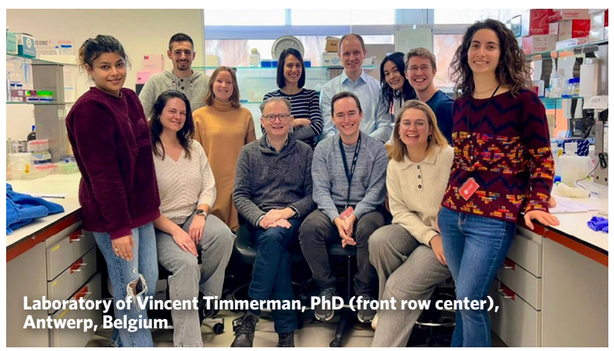
With CMTA support of $8,200, researchers at the University of Wisconsin-Madison in Madison, WI, led by John Svaren, PhD, are looking to discover new biomarkers for CMT1A, CMTX1, and CMT2A by analyzing the plasma from patient-donated blood samples.

IMPACT: Better biomarkers to measure if a treatment works, leading to a stronger clinical trial readiness for new CMT treatments.

AAV Genetic Therapy for CMT4B1, 4B2, 4B3, and 4H – Genetic Therapy

With CMTA support of $281,000, researchers at the San Raffaele Scientific Institute in Milan, Italy, led by Professor Alessandra Bolino, PhD, are developing a new gene therapy approach for CMT4B1, a severe type of CMT.

IMPACT: Potential new genetic therapy to treat several types of CMT.



Laboratory of Vincent Timmerman, PhD (front row center), Antwerp, Belgium.

Activating Selective Protein Degradation to Treat CMT1 Neuropathies – Drug Repurposing

With CMTA support of $440,637, researchers at the Uniformed Services University of the Health Sciences in Bethesda, Maryland, led by Jordan VerPlank, PhD, are building upon previous successful CMTA-funded initiatives. Early work from the VerPlank lab showed that increasing cGMP levels with an FDA-approved drug can improve CMT symptoms; this work is now being tested in CMT models, taking it one step closer to approval for use in humans. *(See Improving Proteasome Function to Treat CMT 1A and 1B in the Sponsored Research Completed in 2023 section, page 15.)*

IMPACT: Potential to treat many types of CMT. Repurposing a drug that is already approved can quickly bring treatments to the community.

Targeting SREBP Regulation for CMT1A – Treatment Development

With CMTA support of $74,000, researchers at the University of Wisconsin-Madison in Madison, WI, are expanding their research on lowering PMP22 overexpression in CMT1A by using an FDA-approved drug. Previous CMTA-supported research demonstrated that reducing PMP22 protein levels led to symptom improvement in a CMT1A model.

IMPACT: Repurposing a drug that is already approved can quickly bring treatments to the community.

ONGOING SPONSORED RESEARCH— PROJECTS APPROVED BEFORE 2023 AND WILL NOT COMPLETE UNTIL 2024 OR LATER

CMT1B Biomarkers and Outcome Measures – Clinical Trial Readiness

With CMTA support of $529,971, an international team of researchers from the Inherited Neuropathies Consortium, led by Michael Shy, MD, at the University of Iowa in Iowa City, IA, is studying the natural history of CMT1B to learn how this type of CMT progresses over time by measuring changes in various biomarkers in blood, skin biopsies, and calf muscle fat fraction.

IMPACT: Understanding CMT1B progression to prepare for rapid testing of new treatments.

CMTX1 Biomarkers and Outcome Measures – Clinical Trial Readiness

With CMTA support of $529,971, an international team of researchers from the Inherited Neuropathies Consortium, led by Michael Shy, MD, at the University of Iowa in Iowa City, IA, is studying the natural history of CMTX1 to learn how this type of CMT progresses over time by measuring changes in various biomarkers in blood, skin biopsies, and calf muscle fat fraction.

IMPACT: Understanding CMTX1 progression to prepare for rapid testing of new treatments.

CMT2A Biomarkers and Outcome Measures – Clinical Trial Readiness

With CMTA support of $572,055, an international team of researchers from the Inherited Neuropathies Consortium, led by Michael Shy, MD, at the University of Iowa in Iowa City, IA, is studying the natural history of CMT2A to learn how this type of CMT progresses over time by measuring changes in various biomarkers in blood, skin biopsies, and calf muscle fat fraction.

IMPACT: Understanding CMT2A progression to prepare for rapid testing of new treatments.

CMT2F Biomarkers and Outcome Measures – Clinical Trial Readiness

With CMTA support of $302,071, an international team of researchers from the Inherited Neuropathies Consortium, led by Michael Shy, MD, at the University of Iowa in Iowa City, IA, is studying the natural history of CMT2F to learn how this type of CMT progresses over time by measuring changes in various biomarkers in blood, skin biopsies, and calf muscle fat fraction.

IMPACT: Understanding CMT2F progression to prepare for rapid testing of new treatments.

CONTINUED ON PAGE 21

	STAR ALLIANCE PARTNERS	THERAPY TYPE	DRUG DEVELOPMENT STAGE
			Discovery · Research Tools · Preclinical · Phase I · Phase II · Phase III
2	NMD Pharma (all genetically confirmed Type 2's)	Small Molecule	Phase II
2A	STAR Alliance Partner D	Small Molecule	Preclinical
2A	STAR Alliance Partner F	Stem Cell Licensing	Preclinical
2A	STAR Alliance Partner I	Genetic Therapy	Preclinical
2A	STAR Alliance Partner J	Animal Model Licensing	Preclinical
2A	**University of Iowa and INC Sites**	Biomarkers and Natural History	Preclinical
2A	**Gladstone Institutes - UCSF**	Genetic Therapy - CRISPR	Preclinical - Completed
2A	STAR Alliance Partner G	Small Molecule	Preclinical - Completed
2A	STAR Alliance Partner H	Small Molecule	Preclinical - Completed
2A	STAR Alliance Partner K	Small Molecule	Preclinical - Completed
2A	**STAR Alliance Partner C**	In Vitro Model	Research Tools
2A	**CMTA - Rat Model Patent Award**	New Animal Model	Research Tools
2A	**New York Stem Cell Foundation**	Stem Cell Lines - Biobank	Research Tools
2A	**University of Wisconsin - Madison**	Biomarker Discovery	Discovery
2C	Actio Biosciences	Small Molecule	Preclinical
2C	**Jackson Laboratory**	SARM1/Target Validation	Preclinical - Completed
2D	**Jackson Laboratory**	SARM1/Target Validation	Preclinical - Completed
2E	Orthogonal Neuroscience	Antibody	Preclinical
2E	**University of Miami**	Genetic Therapy - ASO	Preclinical
2E	**Gladstone Institutes - UCSF**	Genetic Therapy - CRISPR	Preclinical - Completed
2E	**Jackson Laboratory**	SARM1/Target Validation	Preclinical - Completed
2E	**Ohio State University**	Genetic Therapy - AAV	Preclinical - Completed
2E	**New York Stem Cell Foundation**	Stem Cell Lines - Biobank	Research Tools
2F	**University of Iowa and INC Sites**	Biomarkers and Natural History	Preclinical
2S	**Jackson Laboratory**	SARM1/Target Validation	Preclinical - Completed
2S	**Vanda**	Genetic Therapy - ASO	Preclinical
2Y	**New York Stem Cell Foundation**	Stem Cell Lines - Biobank	Research Tools
SORD	Applied Therapeutics	Small Molecule	Phase III
HSN-1	**University College London**	Clinical Trial	Phase II
VUS	**University of Miami**	Gene Identification	Discovery
VUS	**The Genesis Project Foundation**	Gene Identification	Discovery
4	**4A - University of Texas Southwestern**	Genetic Therapy - AAV	Preclinical
4	**4B - Ospedale San Raffaele (OSR)**	Small Molecule	Preclinical
4	**4B1, 4B2, 4B3, 4H - Ospedale San Raffaele (OSR)**	Genetic Therapy - AAV	Preclinical
4	**4J - Elpida**	Genetic Therapy - AAV	Preclinical
4	**4J - Jackson Laboratory**	SARM1/Target Validation	Preclinical - Completed
4	**New York Stem Cell Foundation**	Stem Cell Lines - Biobank	Research Tools
ALL	**Inherited Neuropathies Consortium (INC)**	Research and Clinical Tools	All Stages to Phase III
ALL	ARQ Genetics	Gene Expression	Preclinical
ALL	Charles River	Animal Models	Preclinical
ALL	Cleveland Clinic	Histology	Preclinical
ALL	Frontage Laboratories	Chemical Analysis	Preclinical
ALL	Jackson Laboratory	Animal Models	Preclinical
ALL	PsychoGenics	Preclinical Testing Partner	Preclinical
ALL	BrainXell	In Vitro Models	Research Tools
ALL	**New York Stem Cell Foundation**	Stem Cell Lines - Biobank	Research Tools
ALL	WuXi	Chemical Analysis	Research Tools

THIS CHART ILLUSTRATES THE PROGRESSION AND CURRENT STATUS OF CMTA-FUNDED RESEARCH PROJECTS ACROSS VARIOUS STAGES OF DEVELOPMENT, FROM DISCOVERY TO CLINICAL TRIALS. BOLD TEXT INDICATES PROJECTS DIRECTLY FUNDED BY CMTA.

ONGOING CMTA-SPONSORED RESEARCH

CONTINUED FROM PAGE 19

The Inherited Neuropathy Consortium – Clinical Trial Readiness


Michael Shy, MD, University of Iowa

With CMTA support of $206,018, an international team of researchers from the Inherited Neuropathies Consortium (INC), led by Michael Shy, MD, at the University of Iowa in Iowa City, IA, made significant progress in 2023. This grant facilitated the development of critical outcome measures and biomarkers at several of INC's 20 sites and supported the training of new CMT researchers and clinicians.

IMPACT: Understanding CMT progression to prepare for rapid testing of new treatments.

Development of a New CMT1A Research Toolbox: An Alternative Human Stem Cell-Based Strategy – Preclinical Toolbox

With CMTA support of $98,890, researchers at the Hasselt University in Hasselt, Belgium, led by Esther Wolfs, PhD, are using dental pulp to develop a new model of CMT1A by turning dental pulp-derived pluripotent stem cells (hDPSC) donated by community members with 1A into Schwann cells which can be used for studying the biology of this type of CMT.

IMPACT: New preclinical models of CMT1A.

Development of Advanced Research Diagnostic Capabilities for The CMT Community (VUS Project) – GENESIS – Gene Discovery


Stephan Züchner, MD, PhD, University of Miami

With CMTA support of $391,902, researchers at the GENESIS Project, led by Stephan Züchner, MD, PhD, are working to close what's called the "diagnostic gap" in CMT by building a large database of sequenced DNA from CMT community members all over the world. This ongoing work has led to the discovery of several new CMT genes in recent years, such as CADM3 (CMT2GG), COQ7 (CMT-COQ7), ITPR3 (CMT1J), and SORD (CMT-SORD).

IMPACT: Each new gene discovery can lead rapidly to a new potential treatment.

CONTINUED ON PAGE 22

ONGOING CMTA-SPONSORED RESEARCH

CONTINUED FROM PAGE 21

Schwann Cell-Targeted Gene Therapy Approaches to Treat CMT1A and Other Demyelinating Neuropathies – Genetic Therapy

With CMTA support of $121,000, an international team of researchers, led by John Svaren, PhD at the University of Wisconsin-Madison, in Madison, WI, Steven Gray, PhD, at the University of Texas Southwest in Dallas, TX, and Kleopas Kleopa, MD, at the Cyprus Institute of Neurology and Genetics, in Nicosia, Cyprus, is developing a potential gene therapy for CMT1A.
**This project is part of an ongoing joint project. Dr. Svaren's portion was completed in 2023, but the other two continue. See the project by the same title in Sponsored Research Projects Completed in 2023, page 17.*

IMPACT: Potential new genetic therapy to treat several types of CMT.

Nanoparticle-Based Gene Delivery to Schwann Cells for Treating CMT Disease – Genetic Therapy

With CMTA support of $299,992 in collaboration with the Muscular Dystrophy Association, researchers at the Cyprus Institute of Neurology and Genetics in Nicosia, Cyprus, led by Alexia Kagiava, PhD, are developing nanoparticles to deliver genetic therapy approaches for CMTX1, with potential to also treat CMT1A and CMT1B.

IMPACT: New delivery system for genetic therapy to treat several types of CMT.

Hereditary Sensory Neuropathy Serine Trial (SENSE trial) – Phase II Clinical Trial for HSN1

With CMTA support of $354,826, researchers at the Queen Square Institute of Neurology at University College London in the United Kingdom, led by Mary Reilly, MD, opened recruitment in August 2023 for a Phase II clinical trial testing a drug in a type of CMT called Hereditary Sensory Neuropathy 1 (HSN1) and to further validate calf fat fraction MRI as an outcome measure in CMT clinical trials. This is the first clinical trial to use fat fraction MRI as a primary outcome.

IMPACT: Potential Treatment for HSN1 and validation of an important outcome measure.

Pharmacologic Activation of the ATF6 and IRE1/Xbp1 Branches of the UPR for Therapeutic Intervention in CMT1B Neuropathy – Treatment Development

With CMTA support of $33,000, researchers at the San Raffaele Scientific Institute in Milan, Italy, led by Maurizio D'Antonio, PhD, are working on a treatment approach for CMT1B that targets the defective protein that leads to the disease by "turning on" the body's natural unfolded protein response (UPR) to remove the defective protein from cells effectively.

IMPACT: Potential treatment for CMT1B and other types of CMT where activating the UPR can help.

CMTA-STAR ALLIANCE:
STRATEGIC PARTNERSHIPS TO ACCELERATE RESEARCH

Through STAR, CMTA collaborates with over 40 partners, including pharmaceutical, biotechnology, and research organizations. This network, expanded from five original partners, benefits from CMTA's expertise in model development, study design, and regulatory navigation, accelerating treatment advancements for CMT.

In 2023, CMTA-STAR Alliance Partners made significant strides in developing therapies for many types of CMT. Key partnerships with companies like Applied Therapeutics, which is conducting an ongoing Phase III trial for CMT-SORD, Armatus Bio, and Vanda Pharmaceuticals, led to progress in genetic and small molecule therapies. NMD Pharma planned Phase II trials, and Orthogonal Neuroscience explored antibody-based therapies. These collaborations continue to drive therapeutic advancements, highlighting CMTA's commitment to improving the lives of everybody with CMT.

A YEAR OF PROGRESS AND GRATITUDE

Together, we fund research and foster a community of empowerment and resilience. Thank you for being the driving force behind our dual mission to accelerate research and empower patients, making a profound difference in the lives of those with CMT. Your contributions fuel scientific breakthroughs and inspire a future where effective treatments and a cure for CMT are within reach, showcasing the power of collective action and unwavering commitment.

CMTA CENTERS OF EXCELLENCE

CMTA's mission is to support the development of new treatments for CMT, to improve the quality of life for people with CMT, and, ultimately, to find a cure. One of the many ways we implement this mission is by sponsoring patient-focused, multi-disciplinary Centers of Excellence CMT clinics. World-renowned CMT care specialists and researchers staff each CMTA Center of Excellence, ensuring those living with CMT receive only the best comprehensive care for themselves and their loved ones.

CMTA Centers of Excellence affiliated with the Inherited Neuropathy Consortium (INC), marked below with an asterisk, goes further by collecting and recording genetic, biological, and other data from individuals with CMT as part of CMTA-funded research. For more information, visit cmtausa.org/coe.

ARKANSAS

LITTLE ROCK (PEDIATRIC)
Arkansas Children's Hospital
Clinical Director:
Aravindhan Veerapandiyan, MD
Appts: 501-364-1850

CALIFORNIA

LOS ANGELES (ADULT & PEDIATRIC)
Cedars-Sinai Medical Center
Clinical Director: Richard A. Lewis, MD
Appts: 310-423-4268

PALO ALTO (PEDIATRIC)
Stanford Children's Health*
Clinical Directors: John Day, MD, PhD, and Ana Tesi Rocha, MD
Appts: 650-723-0993

PALO ALTO (ADULT)
Stanford Neuromuscular Program*
Clinical Director: John Day, MD, PhD
Appts: 650-723-6469

SAN FRANCISCO (ADULT)
University of California, San Francisco
Clinical Director: Mark Terrelonge, MD
Appts: 415-353-2273

SAN FRANCISCO (PEDIATRIC)
University of California, San Francisco
Clinical Director: Alex Fay, MD, PhD
Appts: 415-353-7596

COLORADO

AURORA (ADULT)
University of Colorado*
Clinical Director: Vera Fridman, MD
Appts: 720-848-2080

AURORA (PEDIATRIC)
Children's Hospital Colorado
Clinical Director: Michele Yang, MD
Appts: Alison Ballard, 720-777-3907

CONNECTICUT

FARMINGTON (PEDIATRIC)
Connecticut Children's Medical Center, Farmington*
Clinical Director: Gyula Acsadi, MD, PhD
Appts: Nanci Stolgitis, RN, 860-837-7500

NEW BRITAIN (ADULT & PEDIATRIC)
Hospital for Special Care
Clinical Director: Kevin J. Felice, DO
Appts: Sharon McDermott, 860-612-6305

NEW HAVEN (ADULT)
Yale School of Medicine
Clinical Director: Sasha Zivkovic, MD
Appts: 203-785-4085

FLORIDA

ORLANDO (PEDIATRIC)
Nemours Children's Hospital*
Clinical Director: Omer Abdul Hamid, MD
Appts: 407-650-7715

GAINESVILLE (ADULT & PEDIATRIC)
University of Florida
Clinical Director: James Wymer, MD, PhD
Appts: 352-294-5400

JACKSONVILLE (ADULT)
Mayo Clinic Florida
Clinical Director: Christopher Lamb, MD
Appts: 904-953-0853

FLORIDA (CONT.)

MIAMI (ADULT)
University of Miami*
Clinical Director: Mario Saporta, MD
Appts: 305-243-9173

MIAMI (PEDIATRIC)
Nicklaus Children's Hospital
Clinical Director: Migvis Monduy, MD
Appts: 786-624-2154

ILLINOIS

CHICAGO (ADULT & PEDIATRIC)
Northwestern Memorial Hospital
Clinical Director: Daniela Maria Menichella, MD, PhD
Appts: 312-695-7950

University of Illinois at Chicago
Clinical Director: Charles K. Abrams, MD, PhD
Appts: 312-996-4780

Rush University
Clinical Director: Ryan D. Jacobson, MD
Appts: Sherri Taylor-Kennedy, 312-942-4500

O'FALLON (ADULT AND PEDIATRIC)
HSHS St. Elizabeth's Hospital
Clinical Director: Raghav Govindarajan, MD
Appts: 618-641-5803

IOWA

IOWA CITY (ADULT & PEDIATRIC)
University of Iowa Hospitals & Clinics*
Clinical Director: Michael E. Shy, MD
Appts: 319-384-6362

KENTUCKY

LOUISVILLE (ADULT)
University of Louisville
Clinical Director: Zeng Y. Wang, MD, PhD
Appts: Anson Ashburn, 502-588-4800

MARYLAND

BALTIMORE (ADULT & PEDIATRIC)
Johns Hopkins University*
Clinical Directors: Charlotte Sumner, MD, and Bipasha Mukherjee-Clavin, MD, PhD
Appts: Adult—410-614-1196, Pediatric—410-955-4259

MASSACHUSETTS

BOSTON (ADULT & PEDIATRIC)
Massachusetts General Hospital*
Clinical Director: Reza Seyedsadjadi, MD
Appts: Tamika Scott, 617-726-3642

MICHIGAN

DETROIT (ADULT)
Wayne State University School of Medicine and Detroit Medical Center*
Clinical Director: Ryan Castoro, MD
Appts: 313-745-3000

ANN ARBOR (ADULT & PEDIATRIC)
University of Michigan
Clinical Co-Directors: Gary Gallagher, MD, and Brett McRay, MD
Appts: 734-936-9020

MINNESOTA

MAPLE GROVE (ADULT)
University of Minnesota*
Clinical Director: David Walk, MD
Appts: 763-898-1000

MISSOURI

ST. LOUIS (ADULT & PEDIATRIC)
Washington University School of Medicine
Clinical Director: Stefanie Geisler, MD
Appts: 314-362-6981

NEBRASKA

OMAHA (ADULT)
Chi Health Clinic Neurology Institute
Clinical Director: Yu-Ting Chen, MD
Appts: 402-717-0070

NEW JERSEY

HACKENSACK (ADULT & PEDIATRIC)
Hackensack University Medical Center
Clinical Director: Florian Thomas, MD, PhD
Appts: Annerys Santos, 551-996-1324

NEW YORK

ROCHESTER (ADULT & PEDIATRIC)
University of Rochester*
Clinical Director: David Herrmann, MD
Appts: 585-275-2559

NORTH CAROLINA

CHAPEL HILL (ADULT & PEDIATRIC)
University of North Carolina*
Clinical Director: Rebecca Traub, MD
Appts: 984-974-4401

CHARLOTTE (ADULT & PEDIATRIC)
Atrium Health Neurosciences Institute
Clinical Director: Urvi Desai, MD
Appts: 704-446-1900

OHIO

COLUMBUS (ADULT & PEDIATRIC)
Nationwide Children's Hospital
Clinical Director: Zarife Sahenk, MD, PhD
Appts: 614-722-2203

COLUMBUS (ADULT & PEDIATRIC)
Ohio State University, Wexner Medical Center*
Clinical Director: Michael Isfort, MD
Appts: 614-293-4969

PENNSYLVANIA

HERSHEY (PEDIATRIC)
Penn State Health Hershey Medical Center
Clinical Director: Ashutosh Kumar, MD
Appts: 717-531-2908

PHILADELPHIA (ADULT)
Hospital of the University of Pennsylvania*
Clinical Director: Steven Scherer, MD, PhD
Scheduling for Clinic Visits:
Shana Millner, 215-662-3606
Scheduling for Research Visits:
Pooja Patel, 215-898-0180

PENNSYLVANIA (CONT.)

PHILADELPHIA (PEDIATRIC)
Hospital of the University of Pennsylvania*
Clinical Director: Sabrina Yum, MD
Appts: Hannah Borger, 215-590-1719

PITTSBURGH (PEDIATRIC)
Children's Hospital of Pittsburgh
Clinical Director: Hodas Abdel-Hamid, MD
Appts: 412-692-6106

TEXAS

AUSTIN (ADULT)
Austin Neuromuscular Center
Clinical Director: Yessar Hussain, MD
Appts: 512-920-0140

DALLAS (PEDIATRIC)
University of Texas Southwestern
Clinical Director: Kaitlin Batley, MD
Appts: 214-456-2768

BEDFORD (ADULT 16+)
Kane Hall Barry Neurology
Clinical Director:
Sharique Ansari, MD, MPH
Appts: 817-267-6290, option 4

HOUSTON (ADULT)
Baylor College of Medicine
Clinical Director: Thomas Lloyd, MD
Appts: 713-798-2273

HOUSTON (ADULT)
Houston Methodist Hospital
Clinical Director: Jun Li, MD
Appts: 713-441-3763

UTAH

SALT LAKE CITY (ADULT & PEDIATRIC)
University of Utah*
Clinical Director:
Russell Butterfield, MD, PhD
Appts: 801-585-7575

SALT LAKE CITY (PEDIATRIC)
Primary Children's Hospital
Clinical Director:
Russell Butterfield, MD, PhD
Appts: 801-213-7756

SALT LAKE CITY (PEDIATRIC)
Shriner's Hospital
Clinical Director:
Russell Butterfield, MD, PhD
Appts: 801-536-3564

WASHINGTON

SEATTLE (ADULT)
University of Washington Medical Center*
Clinical Director: Michael Weiss, MD
Appts: Gail Schessler, 206-598-7688

SEATTLE (ADULT)
Swedish Neuroscience Institute
Clinical Director:
Christyn Edmundson, MD
Appts: 206-320-3494

SEATTLE (PEDIATRIC)
Seattle Children's Hospital
Clinical Director: Seth Perlman, MD
Appts: Kara Smith, BSN, 206-987-6678

WASHINGTON, DC

(ADULT)
Medstar Georgetown University
Clinical Director: Nicholas Streicher, MD
Appts: 202-444-1774

(PEDIATRIC TO AGE 21)
Children's National Hospital
Clinical Director:
Diana Bharucha-Goebel, MD
Appts: Kathleen Smart, 202-476-6193

AUSTRALIA

WESTMEAD (PEDIATRIC)
The Children's Hospital at Westmead*
Clinical Director: Manoj Menezes, MD
Research Director: Joshua Burns, PhD
Appts: (02) 98451325
daralyn.hodgson@health.nsw.gov.au

BELGIUM

B-2650 EDEGEM (ADULT & PEDIATRIC)
Antwerp University Hospital
Clinical Director:
Prof. Dr. Peter De Jonghe
Appts: +32 3 821 34 23
Neuromusculaire@uza.be

UNITED KINGDOM

LONDON (ADULT)
University College London Hospitals*
Clinical Director: Mary M. Reilly, MD
Appts: Mariola Skorupinska, (0044)2034488019
mariola.skorupinska@uclh.nhs.uk
St. George's University Hospital
Clinical Directors:
Niranjanan Nirmalananthan, PhD, and Emma Matthews, PhD
Email: nervemuscle@stgeorges.nhs.uk

ITALY

MILAN (ADULT & PEDIATRIC)
C. Besta Neurological Institute*
Clinical Director: Davide Pareyson, MD
Appts: +39-02-70631911
sara.nuzzo@istituto-besta.it

CMTA Charcot-Marie-Tooth Association By the Numbers

PERFECT 100%
Highest rating 4 years in a row!

Charity Navigator ✦ FOUR-STAR ✦

IN 2023, CMTA RAISED $6,083,894 IN DONATIONS

90% of every dollar donated is spent on CMTA's mission

$4.3M INVESTED THROUGH STAR
Strategy To Accelerate Research

$29.6 Million in STAR Research Investments Since 2008

50 Active Research Projects

55 CMTA Centers of Excellence

40+ Research Partners

6,400 Patients as Partners in Research

27 WALK & CYCLE 4 CMT Events

$326,422 Raised by WALK & CYCLE 4 CMT Events

142 Camp Footprint Campers

118 Camp Footprint Staff

73 CMTA BRANCHES

76 CMTA Branch Meetings

1,740,301 cmtausa.org page views

57,000 social media followers

571 Attendees at the 2023 CMTA Patient/Family Conference

Consolidated Statement of Financial Position

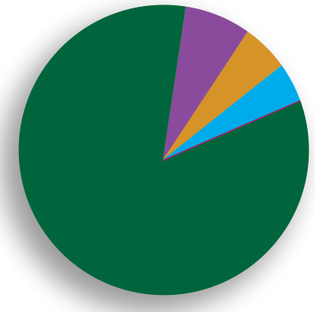
December 31, 2023

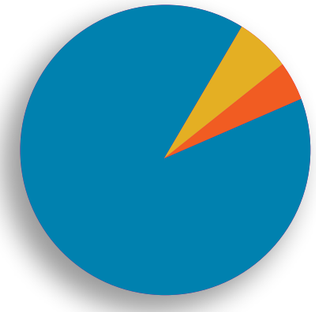
Total Mission Expenses: $5,707,468

- **Research** 75%: $4,273,187
- **Education & Awareness** 25%: $1,434,281

Total Revenue: $6,083,894

- **Contributions** 84%: $5,081,796
- **Branch Revenue** 7%: $428,913
- **Investment Income** 5%: $313,325
- **Special Events** 4%: $242,230
- **Other Revenue** 0.3%: $17,630
- **Grants Received** 0%: $0





Total Expenses: $6,378,899

- **Mission Services** 90%: $5,707,468
- **General Management** 6%: $369,088
- **Fundraising** 4%: $302,343

Thank You to Our Corporate Partners

aetrex — www.aetrex.com

allard — www.allardusa.com

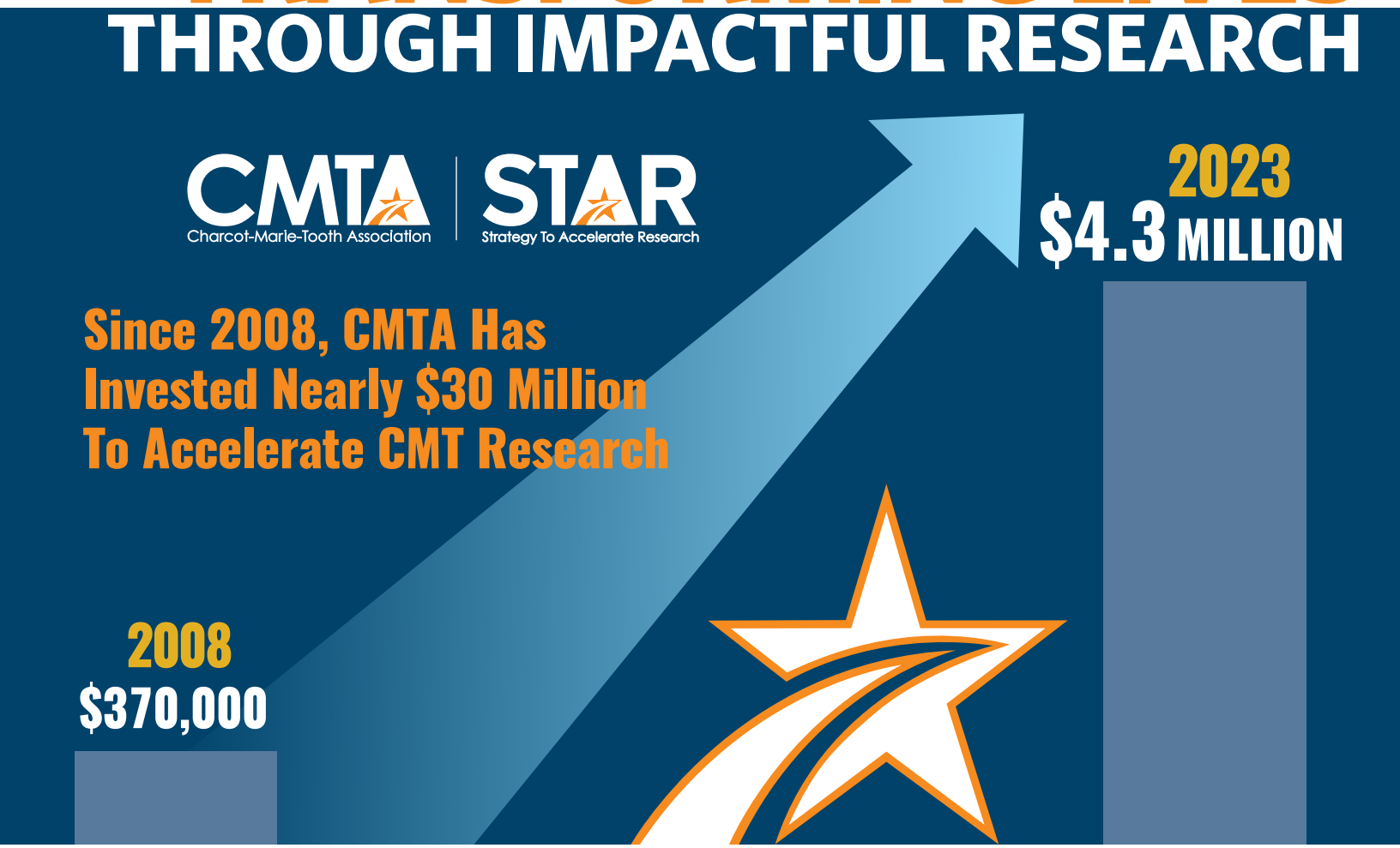
Turbo Med ORTHOTICS USA — www.turbomedusa.com

CMTA
Charcot-Marie-Tooth Association

P.O. Box 105
Glenolden, PA 19036
1-800-606-CMTA (2682)
FAX (610) 499-9267
cmtausa.org

INDECIA HERE

TRANSFORMING LIVES
THROUGH IMPACTFUL RESEARCH



The Charcot-Marie-Tooth Association (CMTA) is a community-led, community-driven 501(c)(3) nonprofit organization with a mission to support the development of new treatments for CMT, to improve the quality of life for people with CMT, and, ultimately, to find a cure. As the leading global philanthropic funder of CMT research, CMTA unites the community with clinicians and industry experts to accelerate the advancement of treatments, with investments of $29.6 million since 2008.

For more information, visit **www.cmtausa.org**