Stanford



Suzanne Tharin

CONTACT INFORMATION

- **Contact at the Palo Alto VA**

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Bio

BIO

Suzanne Tharin, MD PhD joined the faculty at Stanford University in 2012 as an Assistant Professor of Neurosurgery. Following her undergraduate degree in Physiology and a Master's degree in Anatomy and Cell Biology at the University of Toronto, Dr. Tharin completed a PhD in Genetics at Cold Spring Harbor Laboratory and SUNY Stony Brook. She received her MD from Columbia University and then completed her neurosurgery residency at the Brigham and Women's Hospital/Children's Hospital Boston/Harvard Medical School program. She subsequently completed a clinical fellowship in complex spine surgery at the Cleveland Clinic. Her research program encompasses the molecular controls over cortical neuronal development, spinal cord injury, and regenerative strategies for spinal cord repair, including stem cell-based strategies. As a practicing neurosurgeon at the Palo Alto VA and Stanford University Hospital, Dr. Tharin is dedicated to translating an understanding of neural development into regenerative strategies for the treatment of spinal cord injury.

ACADEMIC APPOINTMENTS

- Associate Prof-Univ Med Line, Neurosurgery
- Member, Bio-X
- Member, Wu Tsai Human Performance Alliance
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Wu Tsai Neurosciences Institute

HONORS AND AWARDS

- Trinity College Scholarship, University of Toronto (1990)
- Life Sciences Summer Studentship, University of Toronto (1991)
- University of Toronto Open Fellowship, University of Toronto (1992)
- Alpha Omega Alpha, Columbia University College of Physicians and Surgeons (2003)
- Seymour L Kaplan Memorial Scholarship, Columbia University College of Physicians and Surgeons (2003)
- Glasgow-Rubin Achievement Award, Columbia University College of Physicians and Surgeons (2004)
- Neurosurgery Research and Education Foundation (NREF) Fellowship, American Association of Neurological Surgeons (AANS) (2008)

- RUNN Resident Research Award, Congress of Neurological Surgeons (CNS) (2009)
- AO Spine Young Investigator Research Grant Award, AOSpine North America (2014)
- AO Spine Young Investigator Research Grant Award, AOSpine North America (2015)
- McCormick Faculty Award, Stanford University (2015)
- K08 Mentored Clinical Scientist Career Development Award, National Institutes of Neurological Disorders and Stroke (2015-2020)

PROFESSIONAL EDUCATION

- Fellowship, Cleveland Clinic , Complex Spine (2012)
- Residency, Brigham and Women's Hospital/Children's Hospital Boston/Harvard Medical School , Neurosurgery (2011)
- MD, Columbia University (2004)
- PhD, Cold Spring Harbor Laboratory/SUNY Stony Brook , Genetics (2000)
- MSc, University of Toronto , Anatomy and Cell Biology (1994)
- BSc, University of Toronto , Physiology (1991)

LINKS

- Tharin Lab Web Page: http://neurosurgery.stanford.edu/research/tharin/

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

The long-term goal of the research in my lab is the repair of damaged corticospinal circuitry. Attempts at therapeutic regeneration are limited both by the current understanding of the mechanisms that underlie the sequential generation and development of corticospinal motor neurons (CSMN) and by the current understanding of the events occurring within CSMN in the setting of spinal cord injury. A thorough understanding of the molecular controls over CSMN development might enable enhancement of corticospinal regeneration. MicroRNAs are small, non-coding RNAs that have recently been identified to regulate the expression of entire “suites” of genes during the development of species as diverse as plants, worms, and humans. The work in my lab seeks to identify microRNA controls over the CSMN development and over CSMN response to spinal cord injury.

microRNA CONTROLS OVER CORTICOSPINAL MOTOR NEURON DEVELOPMENT: In collaboration with my postdoctoral mentor, Dr. Jeffrey Macklis, I have characterized differential miRNA expression in CSMN vs. callosal projection neurons (CPN) during their early differentiation. We identified a number of candidate microRNAs that may play roles in shaping CSMN and CPN development. In my lab, we are testing the ability of these microRNAs to direct CSMN development. We are also identifying targets of differentially regulated miRNAs in CSMN.

microRNA CONTROLS OVER CSMN RESPONSE TO SPINAL CORD INJURY: This work seeks to identify and investigate microRNAs differentially expressed in CSMN in the setting of acute spinal cord injury. In addition, building upon candidate microRNAs identified as controls over CSMN development, my group will also specifically investigate their roles in the response of CSMN to acute spinal cord injury, and their possible roles in recovery.

I encourage medical and undergraduate students to contact me if they are interested in being part of my lab. This is an opportunity to participate from the start in some exciting basic and translational research in a field still in its infancy. For undergraduates considering medical school, medical students considering neurosurgery, or lab members simply wishing to understand the clinical motivation of my research, there may also be opportunities for members of my group to shadow me in my clinical work at the Palo Alto VA.

Teaching

STANFORD ADVISEES

Doctoral Dissertation Reader (NonAC)

Blake Zhou

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Neurosciences (PhD Program)

Publications

PUBLICATIONS

- **Mapping hand function with simultaneous brain-spinal cord functional MRI.** *Imaging neuroscience (Cambridge, Mass.)*
  Oliva, V., Bédard, S., Kaptan, M., Pfyffer, D., Chy, B., Aufrichtig, S., Berhe, N., Chaudhari, A. S., Tharin, S., Hu, S. S., Ratliff, J., Smith, Z. A., Smith, et al
  2025; 3

- **miR-193b-365 microcluster downstream ofFezf2coordinates neuron-subtype identity and dendritic morphology in cortical projection neurons.** *iScience*
  Iyer, A., Vaasjo, L. O., Siththanandan, V. B., K C, R., Thurmon, A., Akumuo, M., Lu, V., Nnebe, C., Nair, R., Galazo, M. J., Tharin, S.
  2024; 27 (12): 111500

- **Spinal cord injury: a study protocol for a systematic review and meta-analysis of microRNA alterations.** *Systematic reviews*
  Tigchelaar, S., He, Z., Tharin, S.
  2022; 11 (1): 61

- **miR-409-3p represses Cited2 to refine neocortical layer V projection neuron identity.** *Frontiers in neuroscience*
  Wagner, N. R., Sinha, A., Siththanandan, V., Kowalchuk, A. M., MacDonald, J. L., Tharin, S.
  2022; 16: 931333

- **Epigenetic regulation of nervous system development and function.** *Neurochemistry international*
  MacDonald, J. L., Tharin, S., Hall, S. E.
  2021: 105249

- **An evolutionarily acquired microRNA shapes development of mammalian cortical projections.** *Proceedings of the National Academy of Sciences of the United States of America*
  Diaz, J. L., Siththanandan, V. B., Lu, V., Gonzalez-Nava, N., Pasquina, L., MacDonald, J. L., Woodworth, M. B., Ozkan, A., Nair, R., He, Z., Sahni, V., Sarnow, P., Palmer, et al
  2020

- **Resection of hip heterotrophic ossification leads to resolution of autonomic nervous system dysfunction in a patient with spinal Charcot arthropathy: a case report.** *Spinal cord series and cases*
  Fatemi, P., Prolo, L. M., Giori, N. J., Tharin, S.
  2020; 6 (1): 41

- **Implementation of a patient-specific tapering protocol at discharge decreases total opioid dose prescribed for 6 weeks after elective primary spine surgery.** *Regional anesthesia and pain medicine*
  Joo, S. S., Hunter, O. O., Tamboli, M., Leng, J. C., Harrison, T. K., Kassab, K., Keeton, J. D., Skirboll, S., Tharin, S., Saleh, E., Mudumbai, S. C., Wang, R. R., Kou, et al
  2020

- **Image-guided Percutaneous Polymethylmethacrylate-augmented Spondylodesis for Painful Metastasis in the Veteran Population.** *Cureus*
  Sussman, E. S., Ho, A., Pendharkar, A. V., Tharin, S.
  2019; 11 (4): e4509

- **Patient Satisfaction and Press Ganey Scores for Spine Versus Nonspine Neurosurgery Clinics.** *Clinical spine surgery*
  Chen, Y., Johnson, E., Montalvo, C., Stratford, S., Veeravagu, A., Tharin, S., Desai, A., Ratliff, J., Shuer, L., Park, J.

2019

- **microRNAs Refine Cortical Projection Neuron Subtype during Mammalian Development**
  Siththanandan, V., Diaz, J., Lu, V., Gonzalez-Nava, N., Pasquina, L., MacDonald, J., Woodworth, M., Sahni, V., Sarnow, P., Palmer, T., Macklis, J., Tharin, S.
  WILEY.2018: S276–S277

- **Newly diagnosed glioblastoma: adverse socioeconomic factors correlate with delay in radiotherapy initiation and worse overall survival.** *Journal of radiation research*
  Pollom, E. L., Fujimoto, D. K., Han, S. S., Harris, J. P., Tharin, S. A., Soltys, S. G.
  2018

- **Surgical timing for cervical and upper thoracic injuries in patients with polytrauma** *JOURNAL OF NEUROSURGERY-SPINE*
  Lubelski, D., Tharin, S., Como, J. J., Steinmetz, M. P., Vallier, H., Moore, T.
  2017; 27 (6): 633–37

- **Newly Diagnosed Glioblastoma: Delay in Radiation Therapy Initiation Associated With Adverse Socioeconomic Factors and Worse Survival**
  Pollom, E., Fujimoto, D. K., Harris, J. P., Chin, A. L., Qian, Y., Tharin, S., Soltys, S. G.
  ELSEVIER SCIENCE INC.2017: E100

- **Evidence for use of Teriparatide in Spinal Fusion Surgery in Osteoporotic Patients.** *World neurosurgery*
  Chaudhary, N., Lee, J. S., Wu, J. Y., Tharin, S.
  2016

- **Cervical Spondylotic Myelopathy** *CLINICAL SPINE SURGERY*
  Iyer, A., Azad, T. D., Tharin, S.
  2016; 29 (10): 408-414

- **Symptomatic Anterior Cervical Osteophyte Causing Dysphagia: Case Report, Imaging, and Review of the Literature.** *Cure¯us*
  Chen, Y., Sung, K., Tharin, S.
  2016; 8 (2)

- **Neurosurgical Treatment Planning** *HANDBOOK OF NEURO-ONCOLOGY NEUROIMAGING, 2ND EDITION*
  Bi, W., Olubiyi, O., Tharin, S., Golby, A. J.
  edited by Newton, H. B.
  2016: 217-229

- **Anterolateral approach to the upper cervical spine: Case report and operative technique.** *Head & neck*
  Song, Y., Tharin, S., Divi, V., Prolo, L. M., Sirjani, D. B.
  2015; 37 (9): E115-9

- **A microfluidic device to investigate axon targeting by limited numbers of purified cortical projection neuron subtypes** *INTEGRATIVE BIOLOGY*
  Tharin, S., Kothapalli, C. R., Ozdinler, P. H., Pasquina, L., Chung, S., Varner, J., Devalence, S., Kamm, R., Macklis, J. D.
  2012; 4 (11): 1398-1405

- **Cervical spine arthroplasty: fact or fiction: the absence of need for arthroplasty.** *Clinical neurosurgery*
  Tharin, S., Benzel, E. C.
  2012; 59: 82-90

- **Functional brain mapping and its applications to neurosurgery** *NEUROSURGERY*
  Tharin, S., Golby, A.
  2007; 60 (4): 185-201

- **The short coiled-coil domain-containing protein UNC-69 cooperates with UNC-76 to regulate axonal outgrowth and normal presynaptic organization in Caenorhabditis elegans.** *Journal of biology*
  Su, C., Tharin, S., Jin, Y., Wightman, B., Spector, M., Meili, D., Tsung, N., Rhiner, C., Bourikas, D., Stoeckli, E., Garriga, G., Horvitz, H. R., Hengartner, et al
  2006; 5 (4): 9-?

- **Regulation of calcium binding proteins calreticulin and calsequestrin during differentiation in the myogenic cell line L6** *JOURNAL OF CELLULAR PHYSIOLOGY*
  THARIN, S., Hamel, P. A., Conway, E. M., Michalak, M., Opas, M.
  1996; 166 (3): 547-560

- **WIDESPREAD TISSUE DISTRIBUTION OF RABBIT CALRETICULIN, A NONMUSCLE FUNCTIONAL ANALOG OF CALSEQUESTRIN** *CELL AND TISSUE RESEARCH*
  THARIN, S., Dziak, E., Michalak, M., Opas, M.
  1992; 269 (1): 29-37