Tung-Yu Wu, PhD, SE

Associate Professor, Department of Civil Engineering, National Taiwan University
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學歷 Education

美國密西根大學土木工程博士、航太工程碩士

University of Michigan, Ann Arbor, MI
- **Ph.D. in Civil Engineering** 2019/05
  Dissertation: "Seismic Collapse Resilience of Buildings with Steel Moment Resisting Frames"
- **M.S.E. in Aerospace Engineering** 2018/04

國立臺灣大學結構工程碩士、土木工程學士

National Taiwan University, Taiwan
- **M.S. in Structural Engineering** 2010/06
  Thesis: "Research and Application of RC Structures Using Equivalent Linear System"
- **B.S. in Civil Engineering** 2008/06

經歷 Full-Time Employment

國立臺灣大學土木工程學系，副教授

Associate Professor, Department of Civil Engineering, National Taiwan University, Taiwan 2024/08-Present

國立臺灣大學土木工程學系，助理教授

Assistant Professor, Department of Civil Engineering, National Taiwan University, Taiwan 2019/08-2024/07

中興工程顧問股份有限公司，結構工程師

Structural Engineer, Sinotech Engineering Consultants Co, Ltd., Taiwan 2012/03-2014/05

潤弘精密工程股份有限公司，實習工程師

Engineer Intern, Ruentex Engineering & Construction Co., Ltd., Taiwan 2008/07-2008/08

研究專長 Research Interests

- 鋼結構耐震行為 **Seismic Design of Steel Structures**
- 結構崩塌與破壞分析 **Collapse and Failure Analysis of Structures**
- 結構震損與風險評估 **Seismic Loss and Risk Assessment**
- 地震超材料 **Seismic Metamaterial**

研究計畫 Research Projects

- 國科會，超材料結構之局部共振與消能機制，共同主持人

  The Mechanisms of Local Resonances of Seismic Metamaterials, Co-Principal Investigator, funded by the National Science and Technology Council (NCST), Taiwan 2024/08-2027/07

- 國研院，台美鋼柱耐震研究及最新規範研議，共同主持人

  Seismic Research and Discussion on the Latest Code Development for Taiwan-US Steel Columns, Co-Principal Investigator, funded by the NARLabs, Taiwan 2023/07-2025/06

- 國科會，鋼構建築物不同結構系統應對近斷層地震之震災韌性提升計畫：震損評估與風險管理，計畫主持人

  Seismic Loss Assessment and Risk Management of Steel Buildings with Various Structural Systems under Near-Fault Ground Motions, Principal Investigator, funded by NSTC, Taiwan 2023/08-2025/07

- 科技部，初始幾何缺陷對冷軋鋼管柱耐震崩塌行為之影響，計畫主持人

  Influence of Initial Geometric Imperfection on Collapse Behavior of Cold-Formed Hollow Structural Steel Columns under Seismic Loading, Principal Investigator, funded by MOST, Taiwan 2021/08-2023/07

- 科技部，亞波長共振地震超材料結構設計與試驗研究，共同主持人

  Practical Design and Experimental Study of Subwavelength Seismic Metamaterial Structures, Co-Principal Investigator, funded by the Ministry of Science and Technology (MOST), Taiwan 2021/08-2024/07

- 台北捷運，道岔裂紋缺陷成長趨勢分析工作，協同主持人

  Numerical and Experimental Analysis of Fatigue Crack Growth in Turnout Frogs, Co-Principal Investigator, funded by the Taipei Rapid Transit Corporation (TRTC) 2021/03-2022/05

- 科技部，鋼構造建築物震災韌性整體性評估及提升計畫，計畫主持人

  Evaluation and Improvements of Seismic Resilience for Steel Building Structures in Communities, Principal Investigator, funded by the Ministry of Science and Technology (MOST), Taiwan 2020/01-2021/12

專業證照 Certifications

中華民國結構工程技師

Licensed Structural Engineer, Taiwan 2012/03

榮譽與獎項 Honors and Awards

中華民國結構工程學會，優秀青年結構工程教授獎

Outstanding Young Professor in Structural Engineering, Chinese Society of Structural Engineering 2023/12

中華民國結構工程學會，結構工程論著獎

Best Paper Award in Structural Engineering, Chinese Society of Structural Engineering 2023/12

國立臺灣大學，學術研究績效獎勵

Annual Performance Award, National Taiwan University 2020-2022, 2024

國立臺灣大學，工學院研究生院長獎(指導教授)

Dissertation Supervisor Award, College of Engineering, National Taiwan University 2023, 2024

2024抗震盃(臺南場) - 地震工程模型競賽，首獎(指導老師)

First Prize in IDEERS 2024 Tainan, NCREE 2024/05

2022抗震盃 - 地震工程模型競賽，首獎及最佳設計獎(指導老師)

First Prize and Best Design Award in IDEERS 2022, NCREE 2022/09

美國土木工程師協會，**Raymond C. Reese Research Prize**

Raymond C. Reese Research Prize, American Society of Civil Engineers 2019/04

Rackham International Student Fellowship, University of Michigan, Ann Arbor 2015–2016

Government Scholarship to Study Abroad, Taiwan Ministry of Education 2015–2017

Engineering and Technology Scholarship, China Engineering Consultants, Inc., Taiwan 2009

Tseng Yang-Fu Scholarship, Chinese Institute of Civil & Hydraulic Engineering, Taiwan 2007

學術服務 Professional Affiliations and Activities

美國土木工程師協會，結構工程期刊，副主編

Associate Editor, Journal of Structural Engineering, American Society of Civil Engineers (ASCE) since 2024

國家地震工程研究中心，建築物耐震設計規範研究發展委員會，委員

Committee Member, Research and Development of Building Seismic Design Codes, NCREE since 2019

中華民國結構工程學會，理事

Director Board Member, Chinese Society of Structural Engineering since 2024

中華民國地震工程學會，理事

Director Board Member, Chinese Taiwan Society for Earthquake Engineering since 2024

台灣計算力學學會，理事

Director Board Member, Association of Computational Mechanics Taiwan since 2023

中國土木水利工程學會，會員代表

Member Representative, Chinese Institute of Civil & Hydraulic Engineering since 2024

中華民國結構工程學會，秘書長

Secretary General, Chinese Society of Structural Engineering 2022-2023

國家地震工程研究中心，私有建築物耐震弱層補強計畫，審查委員

Review Committee Member, Seismic Retrofit for Weak Stories of Private Buildings Project, NCREE since 2023

中華民國結構工程學會，學術活動委員會，委員

Committee Member, Academic Activities, Chinese Society of Structural Engineering since 2022

中華民國結構工程學會，隔減震委員會，委員

Committee Member, Seismic Structural Control, Chinese Society of Structural Engineering since 2020

中華民國結構工程學會，耐震補強委員會，委員

Committee Member, Seismic Retrofitting, Chinese Taiwan Society for Earthquake Engineering since 2020

中華民國結構工程學會，耐震規範委員會，委員

Committee Member, Seismic Design Code, Chinese Taiwan Society for Earthquake Engineering since 2020

中華民國結構工程學會，會員委員會，委員兼幹事

Committee Member and Secretary, Membership, Chinese Institute of Civil & Hydraulic Engineering since 2020

中華民國結構工程學會，科普委員會，委員

Committee Member, Science Popularization, Society of Theoretical and Applied Mechanics of ROC 2020-2021

日本建築學會，會員

Member, Architectural Institute of Japan since 2023

中華民國鋼結構協會，會員

Member, Taiwan Institute of Steel Construction since 2020

美國鋼結構協會，會員

Member, American Institute of Steel Construction since 2016

美國土木工程師協會，會員

Member, American Society of Civil Engineers since 2014

著作發表 Journal Publications and Conference Presentations

期刊論文 Journal Publications

- Weng, C.-T., **Wu, T.-Y.***, and Jiang, C.-R. (2024) "Seismic modeling and behavior of hollow structural section columns with initial imperfections" *J. Constr. Steel Res*., 222. https://doi.org/10.1016/j.jcsr.2024.108929
- **Wu, T.-Y.**, Ieong, H. I., Hsu, W.-L.*, Chang, C.-M., and Lai, Y.-C. (2024). "Assessment of fatigue crack growth in metro cast manganese frogs and inspection strategy" *Engineering Failure Analysis*, 108512. https://doi.org/10.1016/j.engfailanal.2024.108512
- **Wu, T.-Y.**, Teng, W.-L., Wang, S.-J.*, and Chang K.-C. (2024). "Feasibility studies in applying cork to pile-type two-layered seismic metamaterials" *Soil Dynamics and Earthquake Engineering*, 182. https://doi.org/10.1016/j.soildyn.2024.108698
- **Wu, T.-Y.***, Pal, P. S., and Wang, H.-C. (2023). "Collapse risk of steel framed buildings with deep columns under tri-directional excitation." *J. Constr. Steel Res*., 208. https://doi.org/10.1016/j.jcsr.2023.108030
- Sediek, O. A.*, **Wu, T.-Y.**, McCormick, J., and El-Tawil, S. (2022). "Prediction of seismic collapse behavior of deep steel columns using machine learning." *Structures*, 40. https://doi.org/10.1016/j.istruc.2022.04.021
- Sediek, O. A., **Wu, T.-Y.***, Chang, T.-H., McCormick, J., and El-Tawil, S. (2021). "Measurement, Characterization, and Modeling of Initial Geometric Imperfections in Wide-Flange Steel Members Subjected to Combined Axial and Cyclic Lateral Loading." *J. Struct. Eng*., 147 (9): 04021120. https://doi.org/10.1061/(ASCE)ST.1943-541X.0003086
- **Wu, T.-Y.***, El-Tawil, S., and McCormick, J. (2020). "Influence of Seismic Design Evolution on the Seismic Collapse Behavior and Losses of Prototype Steel Buildings with Moment Resisting Frames." *J. Struct. Eng*., 146 (9): 04020177. https://doi.org/10.1061/(ASCE)ST.1943-541X.0002743
- Sediek, O. A.*, **Wu, T.-Y.**, McCormick, J., and El-Tawil, S. (2020). "Collapse Behavior of HSS Columns Under Combined Axial and Lateral Loading." *J. Struct. Eng*., 146 (6): 04020094. https://doi.org/10.1061/(ASCE)ST.1943-

541X.0002637

- **Wu, T.-Y.***, El-Tawil, S., and McCormick, J. (2019). "Effect of cyclic flange local buckling on the capacity of steel members." *Eng. Struct.*, 200. https://doi.org/10.1016/j.engstruct.2019.109705
- **Wu, T.-Y.***, El-Tawil, S., and McCormick, J. (2018). "Seismic collapse response of steel moment frames with deep columns." *J. Struct. Eng*., 144 (9): 04018145. https://doi.org/10.1061/(ASCE)ST.1943-541X.0002150
- **Wu, T.-Y.***, El-Tawil, S., and McCormick, J. (2018). "Highly ductile limits for deep steel columns." *J. Struct. Eng*. 144 (4): 04018016. https://doi.org/10.1061/(ASCE)ST.1943-541X.0002002
- Fogarty, J.*, **Wu, T.-Y.**, and El-Tawil, S. (2017). "Collapse Response and Design of Deep Steel Columns Subjected to Lateral Displacement." *J. Struct. Eng.*, 143 (9): 04017130. https://doi.org/10.1061/(ASCE)ST.1943-541X.0001848
- Lo, Y.-Y., **Wu, T.-Y.***, Wang, S.-J. (2024). "New Seismic Attenuation Technology: Resonator-Type Metamaterial" *Structural Engineering*, 39 (1). https://doi.org/10.6849/SE.202403_39(1).0005 (in Chinese)
- Su, Y. C., Wang, S.-J., Chang, W. J., Lin, T.-K., Lin, C.-H., **Wu, T.-Y.**, Chang, K. C., Chen, T.* (2022) "A Review of Seismic Metamaterials for Seismic Protection" *Structural Engineering*, 37 (3). https://doi.org/10.6849/SE.202209_37(3).0004 (in Chinese)
- Chang, T.-H., **Wu, T.-Y.*** (2020). "Effect of Geometric Initial Imperfections on Seismic Collapse Capacity of Steel Special Moment Frames with Deep Columns." *Structural Engineering*, 35 (4). (in Chinese)

研討會論文 Conference Presentations

- **Wu, T.-Y.**, Teng, W.-L., Wang, S.-J.*, and Chang K.-C. (2024). "Feasibility studies in applying cork to pile-type seismic metamaterials" In *24th Korea-Japan-Taiwan Joint Seminar on Earthquake Engineering for Building Structures*. Seoul, South Korea (extended abstract)
- **Wu, T.-Y.**, Ieong, H. I., Hsu, W.-L.*, Chang, C.-M., and Lai, Y.-C. (2024). "Fatigue Growth of Transverse Crack in High Manganesesteel Frogs." In *16th World Congress on Computational Mechanics and 4th Pan American Congress on Computational Mechanics* (abstract only)
- **Wu, T.-Y.**, Weng, C.-T., and Jiang, C.-R. (2023). "Seismic Modeling of HSS Columns with Initial Imperfections." In *23rd Korea-Japan-Taiwan Joint Seminar on Earthquake Engineering for Building Structures*. Taipei, Taiwan (extended abstract)
- Teng, Y.-W., **Wu, T.-Y.**, Weng, C.-T., and Jiang, C.-R. (2023). "Seismic Performance of Square HSS Columns." In *34th KKHTCNN Symposium on Civil Engineering*. Pattaya, Thailand. (abstract only)
- Xiao, W.-Y. and **Wu, T.-Y.** (2023). "Seismic Fragility of Circular Steel Bridge Piers." In *34th KKHTCNN Symposium on Civil Engineering*. Pattaya, Thailand. (abstract only)
- Lo, Y.-Y., Wenzel, N., **Wu, T.-Y.**, and Wang S.-J. (2023). "Theoretical, Numerical, and Experimental Analysis and Design of Tube-Type Resonator Seismic Metamaterials." In *34th KKHTCNN Symposium on Civil Engineering*. Pattaya, Thailand. (abstract only)
- Chang, F.-H, Chiu, S.-Y., Wenzel, N., **Wu, T.-Y.**, and Chen, C.-J. (2023). "Seismic Loss and Risk Assessment of Steel Moment Frames in Taipei Basin." In *34th KKHTCNN Symposium on Civil Engineering*. Pattaya, Thailand. (abstract only)
- **Wu, T.-Y.**, Nguyen, H.-D., Jiang, C.-R., and Weng, C.-T. (2023). "Perfection measurement and prediction for cold-formed hollow structural steel columns using laser scanning techniques and machine learning." In *4th International Conference on Transportation Infrastructure and Sustainable Development TISDIC 2023*. Da Nang, Vietnam. (abstract only)
- Hung, C.-S., **Wu, T.-Y.**, Lee, C.-S., and Huang, Y.-N. (2022). "Development and Evaluation of Mixed Reality-Based Education Tools on Structural Mechanics." In *22nd International Conference on Construction Applications of Virtual Reality*. Seoul, South Korea.
- Wang, H.-C, **Wu, T.-Y.** (2022). "Collapse Assessment of Steel Buildings with Deep Columns under Tri-directional Seismic Excitations." In *15th World Congress on Computational Mechanics & 8th Asian Pacific Congress on Computational Mechanics*. Yokohama, Japan. (abstract only)
- Sediek, O. A., **Wu, T.-Y.**, McCormick, J., and El-Tawil, S. (2022). "Classification of Seismic Failure Modes of Deep Steel Columns Using Machine Learning." In *15th World Congress on Computational Mechanics & 8th Asian Pacific Congress on Computational Mechanics*. Yokohama, Japan. (abstract only)
- **Wu, T.-Y.**, Sediek, O. A, and Chang, T.-H. (2022). "Collapse Fragility of Steel Special Moment Frames with Initial Geometric Imperfections." In *12th National Conference on Earthquake Engineering*, Salt Lake City, UT: Earthquake Engineering Research Institute.
- **Wu, T.-Y.** (2020). "Collapse Behavior of Steel Buildings with Deep Columns under Horizontal and Vertical Ground

Motions." In *17th World Conf. on Earthquake Engineering*. Tokyo: International Association of Earthquake Engineering.

- **Wu, T.-Y.**, El-Tawil, S., and McCormick, J. (2019). "Influence of seismic design code evolution on the seismic losses and resilience of steel buildings." In *International Conference in Commemoration of 20th Anniversary of the 1999 Chi-Chi Earthquake*. Taipei, Taiwan: National Center for Research of Earthquake Engineering.
- **Wu, T.-Y.**, El-Tawil, S., and McCormick, J. (2019). "Seismic capacity of deep steel columns and their influence on the collapse response of steel special moment frames." In *International Conference in Commemoration of 20th Anniversary of the 1999 Chi-Chi Earthquake*. Taipei, Taiwan: National Center for Research of Earthquake Engineering.
- Sediek, O. A., **Wu, T.-Y.**, McCormick, J., and El-Tawil, S. (2019). "Seismic Behavior of HSS Columns Under Lateral Loading." In *International Conference in Commemoration of 20th Anniversary of the 1999 Chi-Chi Earthquake*. Taipei, Taiwan: National Center for Research of Earthquake Engineering.
- **Wu, T.-Y.**, El-Tawil, S., and McCormick, J. (2018). "Ensuring highly ductile behavior for deep steel columns." In *11th National Conf. on Earthquake Engineering*. Oakland, CA: Earthquake Engineering Research Institute.
- **Wu, T.-Y.**, El-Tawil, S., and McCormick, J. (2018). "Experimental study of cyclic flange local buckling." In *Structures Congress 2018*, 49–57. Reston, VA: ASCE.
- **Wu, T.-Y.**, El-Tawil, S., and McCormick, J. (2018). "Seismic collapse response of a four-story steel special moment frame with deep columns." In *Structures Congress 2018*, 213–221. Reston, VA: ASCE.
- **Wu, T.-Y.**, El-Tawil, S., and McCormick, J. (2017). "Effect of drift loading history on the collapse capacity of deep steel columns." In *Structures Congress 2017*, 485–494. Reston, VA: ASCE.
- **Wu, T.-Y.**, El-Tawil, S., and McCormick, J. (2017). "Behavior of steel moment frames with deep column sections under seismic loading." In *16th World Conf. on Earthquake Engineering*. Tokyo: International Association of Earthquake Engineering.
- Chen, C.-J., Su, K. S., **Wu, T.-Y.** (2024). "Lifecycle Cost and Sustainability of Steel Buildings with Various Structural Systems." In *2nd Annual Meeting and Conference of Association of Computational Mechanics Taiwan*. Tainan, Taiwan. (abstract only)
- Chen, C.-J., **Wu, T.-Y.** (2024). "Seismic Losses and Environmental Impacts of Steel Structures in Near-Fault Ground Motion." In *17th National Conf. on Structural Engineering and 7th National Conf. on Earthquake Engineering*. Taichung, Taiwan. (in Chinese)
- Xiao, W.-Y., **Wu, T.-Y.**, Jiang, C.-R., and Ou, Y.-C. (2024). "Seismic Compactness Requirements and Failure Behavior of Steel Bridge Piers subjected to Near-Fault Ground Motions." In *17th National Conf. on Structural Engineering and 7th National Conf. on Earthquake Engineering*. Taichung, Taiwan. (in Chinese)
- Teng, Y.-W., **Wu, T.-Y.**, and Jiang, C.-R. (2024). "Numerical Investigation on Compactness Requirement of Square Hollow Structural Section Columns." In *17th National Conf. on Structural Engineering and 7th National Conf. on Earthquake Engineering*. Taichung, Taiwan. (in Chinese)
- Wenzel, N., **Wu, T.-Y.** (2024). "Experimental Study on Mass-in-Mass Resonant Seismic Metamaterials." In *17th National Conf. on Structural Engineering and 7th National Conf. on Earthquake Engineering*. Taichung, Taiwan. (in Chinese)
- Lo, Y.-Y., Wenzel, N., **Wu, T.-Y.**, and Wang S.-J. (2023). "Low-frequency band-gap seismic metamaterial using dual-layer tube-type resonators." In *1st Annual Meeting and Conference of Association of Computational Mechanics Taiwan*. Keelung, Taiwan. (abstract only)
- Chang, F.-H, **Wu, T.-Y.** (2020). "Evolution of Seismic Resilience of Steel Buildings in Taipei Basin." In *Conference on Theoretical and Applied Mechanics, CTAM 2020*. Yilan, Taiwan. (abstract only, in Chinese)
- Chang, T.-H., **Wu, T.-Y.**, Sediek, O. A., El-Tawil, S., and McCormick, J. (2020). "Influence of geometric initial imperfection on seismic collapse capacity of steel special moment frames with deep columns." In *15th National Conf. on Structural Engineering and 5th National Conf. on Earthquake Engineering*. Tainan, Taiwan. (in Chinese)

指導論文 Advised Dissertation and Thesis

- **Chen, Chi-Jen** (2024). "Lifecycle Cost and Sustainability Analysis of Resilient Steel Structures". Master Thesis. Department of Civil Engineering, National Taiwan University.
- **Wenzel, Nathan** (2024). "Experimental and Numerical Investigations on Dual-Mass Resonant Seismic Metamaterials". Master Thesis. Department of Civil Engineering, National Taiwan University.
- **Xiao, Wen-Yu** (2024). "Seismic Compactness Requirements and Failure Behavior of Steel Bridge Piers subjected to Near-Fault Ground Motions". Master Thesis. Department of Civil Engineering, National Taiwan University.
- **Teng, Yu-Wen** (2024). "Numerical Investigation on Compactness Requirement of Square Hollow Structural

Section Columns". Master Thesis. Department of Civil Engineering, National Taiwan University.

- **Ieong, Ho Ieng** (2023). "Fatigue Crack Growth of Manganese Steel Crossing under High-Speed Impact". Master Thesis. Department of Civil Engineering, National Taiwan University.
- **Lo, Yuan-Yo** (2023). "Effectiveness of Vibration Reduction by Using Resonator-type Seismic Metamaterial: Analysis and Design". Master Thesis. Department of Civil Engineering, National Taiwan University.
- **Weng, Chien-Ting** (2023). "Influence of Initial Imperfections on the Seismic Behavior of Hollow Structural Section Steel Columns". Master Thesis. Department of Civil Engineering, National Taiwan University.
- **Chiu, Sheng-Yu** (2022). "Seismic Loss and Risk Assessment of Steel Structures Building in Taipei Basin". Master Thesis. Department of Civil Engineering, National Taiwan University.
- **Wang, Hsuan-Chieh** (2022). "Seismic Collapse Risk of Steel Buildings with Perimeter Moment Resisting Frames and Deep Columns". Master Thesis. Department of Civil Engineering, National Taiwan University.
- **Chang, Feng-Hsuan** (2021). "Seismic Loss and Risk Assessment of Steel Moment Frames in Taipei Basin". Master Thesis. Department of Civil Engineering, National Taiwan University.
- **Chang, Ting-Hao** (2021). "Influence of geometric initial imperfection on seismic collapse capacity of steel special moment frames with deep columns". Master Thesis. Department of Civil Engineering, National Taiwan University.