Tung-Yu Wu, PhD, SE

Assistant Professor, Department of Civil Engineering, National Taiwan University
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Education

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

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

Research Interests

- **Seismic Design of Steel Structures**
- **Structural Collapse Simulation**
- **Seismic Loss Assessment and Risk Analysis**
- **Seismic Metamaterial and Periodic Structures**
- **Wheel-Rail Impact Simulation**
- **Mixed Reality Learning Environment**

Full-Time Employment

Assistant Professor, Department of Civil Engineering, National Taiwan University, Taiwan 2019/08-Present
Structural Engineer, Sinotech Engineering Consultants Co, Ltd., Taiwan 2012/03-2014/05
Engineer Intern, Ruentex Engineering & Construction Co., Ltd., Taiwan 2008/07-2008/08

Research Projects

- **Seismic Researh and Discussion on the Latest Code Development for Taiwan-US Steel Columns**, Co-Principal Investigator, funded by the National Applied Research Laboratories (NARLabs), Taiwan 2023/07-2025/06
- **Seismic Loss Assessment and Risk Management of Steel Buildings with Various Structural Systems under Near-Fault Ground Motions**, Principal Investigator, funded by MOST, Taiwan 2023/08-2024/07
- **Seismic Loss and Risk Analysis of Perimeter Moment Resisting Frames**, Principal Investigator, funded by the Ministry of Education (MOE), Taiwan 2023/01-2025/12
- **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
- **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
- **Analytical Study of Crack Growth in Railway Crossings under High Wheel-Rail Impacts**, Co-Principal Investigator, funded by the Taipei Rapid Transit Corporation (TRTC) 2021/03-2022/05
- **Evaluation and Improvements of Seismic Resilience for Steel Building Structures in Communities**, Principal Investigator, funded by MOST, Taiwan 2020/01-2021/12

Engineering Consultancy

- **Tsengwen reservoir risk analysis**, for Sinotech Engineering Consultants, Ltd, and Southern Region Water Resources Office, Water Resources Agency, Ministry of Economic Affairs 2021/07-2021/10

Certifications

Structural Engineer, Taiwan 2012/03

Honors and Awards

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

Professional Affiliations and Activities

Director Board Member, Association of Computational Mechanics Taiwan since 2023

Secretary General, Chinese Society of Structural Engineering since 2022

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

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

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

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

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

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

Selected Publications and Presentations

Journal Publications

- **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

Conference Publications and Oral Presentations

- 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.

- 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.
- **Wu, T.-Y.**, Sediek, O. A, 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.
- 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.
- 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.
- **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.

Advised Dissertation and Thesis

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