

# Ting-Yu Huang (黃亭瑜)

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## EDUCATION

Ph.D. in Forensic Science, Sam Houston State University (SHSU), Huntsville, TX, 2024

Dissertation: *“Development of Nanomaterials in Solid Phase Microextraction and Application of Artificial Intelligence for Ignitable Liquids Detection and Classification in Forensic Fire Debris Analysis”*

Chair: Dr. Jorn (Chi-Chung) Yu

Committee Members: Dr. Patrick Buzzini, Dr. Geraldine Monjardez, and Dr. Qingzhong Liu

GPA: 4.0

M.S. in Fire Science, Central Police University, Taiwan, 2015

Thesis: *“Analysis of Salient Factors and Simulation of Fire Scene on Life Casualties in Building Fires: An Empirical Research of New Taipei City”*

GPA: 4.0

B.S. in Fire Science, Central Police University, Taiwan, 2009

GPA: 3.91

Ranked #1 in Graduation

## WORK OR PROFESSIONAL EXPERIENCES

### Academic positions

#### **Central Police University**

Taiwan

*Department of Fire Science, College of Police Science and Technology*

Assistant Professor

2025-present

Research focused on forensic applications of headspace solid phase microextraction (HS-SPME), chemometrics and deep learning (DL)

Courses Taught

Spring 2025 0567; 1113 Fire Debris Evidence Collection and Handling

0093 Special Topics in Fire Services Act and Disaster Prevention and Protection Act

#### **Ming Chuan University**

Taiwan

*Department of Criminal Justice, School of Social Sciences*

Assistant Professor

2024-2025

Courses Taught

Fall 2024 06351 Crime Scene

38243 Emergency Response and Homeland Security

38435 Emergency Plan Planning and Drill

38213 Risk Management

06258 Community Security Management

**Sam Houston State University**

Huntsville, TX

*Department of Forensic Science, College of Criminal Justice*

Doctoral Teaching Fellow

2023

Courses Taught

Fall 2023 FORS 4310 Physical Evidence Techniques

Teaching Assistant

2020-2023

Courses Taught by Dr. Jorn (Chi-Chung) Yu

Fall 2023, Fall 2022, Fall 2021, Fall 2020

FORS 5119 Fire Debris Analysis

Fall 2023, Fall 2022, Fall 2021, Fall 2020

FORS 5360 Pattern Evidence and Physical Evidence Concept

Spring 2022

FORS 6111 Fundamental of Research Methods

Spring 2021

FORS 6335 Advanced Forensic Chemistry

Fall 2021

FORS 5117 Controlled Substance Analysis

Graduate Assistant/Research Assistant

2019-2024

**Taiwan Police College**

Taiwan

*Department of Fire Safety*

Adjunct Assistant Professor

2024-2025

Courses Taught

Fall 2024

Fire Science

Adjunct Lecturer

2015-2019

Adjunct Instructor

2009-2015

Courses Taught

Spring 2019, Spring 2018, Spring 2017, Spring 2016, Spring 2015

Investigation of Fire Causes

Fall 2016, Fall 2015, Fall 2013, Fall 2011, Fall 2010, Fall 2009

Fire Services Act

Spring 2011, Spring 2010

Special Topic on Fire Services Act

Fall 2018

Fire Management and Propaganda

Fall 2017

Disaster Prevention

Spring 2013

Fire Service and Practice

Fall 2013, Spring 2012, Fall 2012

System of Disaster Prevention and Protection Act

**Central Police University**

Taiwan

*Department of Fire Science, College of Police Science and Technology*

Research Assistant

2012-2014

Research on Causal Model of Life Casualties in Fires, National Science and Technology Council Grant (Taiwan), PI: Yuan-Hsiang Lin, Ph.D., 2013.

(Funded for 2013-2014) [NSC 102-2410-H-015-014-]

Research on BFD Curve for the Prediction of Compartment Fire Temperatures, National Science and Technology Council Grant (Taiwan), PI: Po-Chuan Huang, Ph.D., 2012.

(Funded for 2012-2013). [NSC 101-2221-E-015-002-]

**Non-academic positions**

<b>New Taipei City Fire Department</b>	Taiwan
Sub-division Chief, Fire Investigator, Fire Debris Analyst (Fire Investigation Division)	2016-2019
Police Officer, Fire Investigator, Fire Debris Analyst (Fire Investigation Division)	2009-2016
Police Officer (Disaster Management Division)	2009
<b>Internships</b>	Taiwan
Criminal Investigation Bureau (CIB)	2020
Taipei City Fire Department	2008
Hsinchu City Fire Department	2007

**PUBLICATIONS (PEER-REVIEWED ARTICLES)**

Grijalva, J.; **Huang, T. Y.**; Yu, J. C. C.; Buzzini P.; Williams D.; Davidson J. T.; Monjardez G. Analysis of Major Cannabinoids Using Raman Microscopy, Density Functional Theory, Chemometrics and a Novel Artificial Intelligence Approach. *Talanta Open*. **2024**, 10, <https://doi.org/10.1016/j.talo.2024.100337>

**Huang, T. Y.**; Yu, J. C. C. Assessment of Artificial Intelligence to Detect Gasoline in Fire Debris Using HS-SPME-GC/MS and Transfer Learning. *Journal of Forensic Sciences*. **2024**, 00, 1-13. <https://doi.org/10.1111/1556-4029.15550>

**Huang, T. Y.**; Yu, J. C. C. Carbon Nanotubes-assisted Solid-phase Microextraction for the Extraction of Gasoline in Fire Debris Samples. *Journal of Chromatography A*. **2023**, 1701, 464063. <https://doi.org/10.1016/j.chroma.2023.464063>

**Huang, T. Y.**; Yu, J. C. C. Intelligent Framework for Cannabis Classification Using Visualization of Gas chromatography/mass spectrometry Data and Transfer Learning. *Frontiers in Analytical Science*. **2023**, 3, 1125049. <https://doi.org/10.3389/frans.2023.1125049>

**Huang, T. Y.**; Wang, J.; Liu, Q.; Yu, J. C. C. The Application of Wavelet Transform of Raman Spectra to Facilitate Transfer Learning for Gasoline Detection and Classification. *Talanta Open*. **2022**, 5, 100106. <https://doi.org/10.1016/j.talo.2022.100106>

**Huang, T. Y.**; Yu, J. C. C. Development of Crime Scene Intelligence Using a Hand-held Raman Spectrometer and Transfer Learning. *Analytical Chemistry*. **2021**, 93, 8889-8896. <https://doi.org/10.1021/acs.analchem.1c01099>

**Huang, T. Y.**; Huang, D. C.; Lin, Y. S. Research on Constructing the Predictive Model of Life Casualties in Building Fires in New Taipei City and Fire Simulation. *Law Enforcement Review*. **2016**, 12, 1-27.

**Huang, T. Y.**; Huang, D. C.; Lu, J. C.; Lin, Y. S. Research on Constructing the Statistical Models of Predicting Life Casualties in Building Fires in New Taipei City. *Disaster Science*. **2016**, 1, 25-52.

**Huang, T. Y.;** Lin, Y. S. A study of Analyzing Factors that Influence Life Casualties in Building Fires in New Taipei City Using Binary Logistic Regression. *Journal of Disaster Mitigation and Rescue Central Police University*. **2015**, *16*, 99-123.

## FUNDED GRANT

National Science and Technology Council (NSTC) Subsidy for Domestic Scholars and Experts to Attend International Academic Conferences, 2025. [USD 2.5K, NSTC 114-2914-I-130-001-A1]

Development of Carbon Nanotubes Assisted Headspace Chemical Analysis and Artificial Intelligence for Fire Debris Analysis, Forensic Sciences Foundation (FSF) Lucas Research Grant, 2022. (Funded for 2022-2023) [Competitive, USD 5.79K]

## HONORS AND AWARDS

The Graduate & Professional School General Scholarship at SHSU (Spring 2024, Fall 2023)

O. B. Ellis-Gibbs Memorial Scholarship at SHSU (2023-2024)

LTC Michael A. Lytle '77 Academic Prize in Forensic Science at SHSU (2022)

The Graduate School Graduate Studies Travel Award at SHSU (2022-2023)

2022-23 Forensic Sciences Foundation (FSF) Student Travel Grant (2022)

The Graduate School General Scholarship at SHSU (Summer 2023, Spring 2023, Fall 2022, Summer 2022, Spring 2022, Fall 2021)

The Graduate School Graduate Student Research Fund Award at SHSU (2021)

George J. Beto Memorial Scholarship at SHSU (2021-2022)

Forensic Science Doctoral Scholarship at SHSU (2019-2024)

PhD-level Study Abroad Fellowship, Ministry of Education, Taiwan (2019-2022)

Architectural Award of Master's Thesis, Architectural Institute of Taiwan (2015)

## PEER-REVIEWED PRESENTATIONS

**Huang, T. Y.;** Yu, J. C. C. Transfer Learning of Data Classification for Fire Debris Analysis. Proceedings from the Forensic Science Adaptation to Artificial Intelligence Workshop of the 2025 American Academy of Forensic Sciences (AAFS) Annual Scientific Meeting, Baltimore, MD, Oral Presentation, **2025**.

**Huang, T. Y.;** Yu, J. C. C. An Artificial Intelligence-Based Detection of Ignitable Liquid Residues in Fire Debris Using a Deep Convolutional Neural Network. Proceedings from the 2025 American Academy of Forensic Sciences (AAFS) Annual Scientific Meeting, Baltimore, MD, Poster Presentation, **2025**.

**Huang, T. Y.;** Yu, J. C. C. Application of Transfer Learning for GC/MS Data Classification in Fire Debris Analysis. Proceedings from the Great Scientific Exchange (SciX) 2024 Conference, Raleigh, NC, Oral Presentation, October **2024**.

**Huang, T. Y.;** Yu, J. C. C. Application of Transfer Learning and Raman Spectroscopy for Liquid Fuels Classification. Proceedings from the 2024 American Chemical Society (ACS) Fall Meeting, Denver, CO, Oral Presentation, August **2024**.

Laetsch, J. H.; Grijalva J.; **Huang, T. Y.**; Buzzini, P.; Yu, J. C. C.; Davidson, J. T.; Monjardez, G. The Identification and Classification of Major Cannabinoids Using Raman Microscopy, Chemometrics, and a Novel Artificial Intelligence Approach. Proceedings from the 2024 American Academy of Forensic Sciences (AAFS) Annual Scientific Meeting, Denver, CO, Poster Presentation, February **2024**.

**Huang, T. Y.**; Yu, J. C. C. An Evaluation of Headspace Solid Phase Microextraction of Diesel Fuel from Cotton Swabs for Forensic Analysis. Proceedings from the 2024 American Academy of Forensic Sciences (AAFS) Annual Scientific Meeting, Denver, CO, Oral Presentation, February **2024**.

**Huang, T. Y.**; Yu, J. C. C. The Development of a Novel Nanocomposite Using Polypyrrole and Single-walled Carbon Nanotubes for Headspace Solid Phase Microextraction of Alkanes in Forensic Ignitable Liquid Analysis. Proceedings from the 2024 American Academy of Forensic Sciences (AAFS) Annual Scientific Meeting, Denver, CO, Poster Presentation, February **2024**.

**Huang, T. Y.**; Yu, J. C. C. Artificial Intelligent Framework for the Detection of Gasoline Residues in Fire Debris Samples: Transforming Gas Chromatography/mass Spectrometry Data into Image Presentation for Transfer Learning. Proceedings from the 2023 American Chemical Society (ACS) Spring Meeting, Indianapolis, IN, Poster Presentation, March **2023**.

**Huang, T. Y.**; Yu, J. C. C. The Development of Carbon Nanotubes-assisted Solid-phase Microextraction for Fire Debris Analysis. Proceedings from the 2023 American Academy of Forensic Sciences (AAFS) Annual Scientific Meeting, Orlando, FL, Poster Presentation, February **2023**.

**Huang, T. Y.**; Yu, J. C. C. The Detection of Gasoline in Fire Debris Using Artificial Intelligence: Image Transformation of Gas Chromatography and Mass Spectrometry Data and Deep Learning. Proceedings from the 2023 American Academy of Forensic Sciences (AAFS) Annual Scientific Meeting, Orlando, FL, Oral Presentation, February **2023**.

**Huang, T. Y.**; Yu, J. C. C. The Classification of Raman Scattering Patterns Using Wavelet Transform and Transfer Learning. Proceedings from the Great Scientific Exchange (SciX) 2022 Conference, Covington, KY, Oral Presentation, October **2022**.

**Huang, T. Y.**; Yu, J. C. C. New Framework to Support Headspace Chemical Forensics Using Wavelet Scalogram Visualization of Mass Spectrometry Data and Transfer Learning. Proceedings from the 2022 American Chemical Society (ACS) Spring Meeting, San Diego, CA, Poster Presentation, March **2022**.

**Huang, T. Y.**; Yu, J. C. C. The Classification of Cannabis Varieties Through Headspace Chemical Analysis and Transfer Learning. Proceedings from the 2022 American Academy of Forensic Sciences (AAFS) Annual Scientific Meeting, Seattle, WA, Poster Presentation, February **2022**.

**Huang, T. Y.**; Yu, J. C. C. Development of An Intelligent Handheld Raman Analyzer for Scene Investigation. Proceedings from the 2021 National Forensic Science Week - FTCoE Student Research Poster Session, Virtual Conference, September **2021**.

**Huang, T. Y.**; Yu, J. C. C. Application of Deep Learning and Raman Spectroscopy for On-site Gasoline Grade Classification. Proceedings from the 2021 Online Forensic Symposium, Virtual Conference, July **2021**.

**Huang, T. Y.;** Yu, J. C. C. Rapid Classification of Gasoline Using a Handheld Raman Spectrometer With AI Assistance. Proceedings from the Crossing Forensic Borders Online Lecture Series, Event #11, Virtual Conference, May **2021**.

**Huang, T. Y.;** Yu, J. C. C. The Application of Wavelet Transform and Transfer Learning for Gasoline Classification Using a Handheld Raman Spectrometer. Proceedings from the 2021 American Academy of Forensic Sciences (AAFS) Annual Scientific Meeting, Virtual Conference, February **2021**.

**Huang, T. Y.;** Lin, Y. S. Investigation of Factors and Construction of Statistical Models on Predicting Life Casualties in Building Fires in New Taipei City. Proceedings from the 11th Asia-Oceania Symposium on Fire Science and Technology (AOSFST), Taipei, Taiwan, Oral Presentation, September **2018**.

**Huang, T. Y.;** Lin, Y. S. The Analysis of Life Casualties in Building Fires in New Taipei City Using Binary Logistic Regression. Proceedings from the 2014 Taiwan Police College Seminar on Fire Safety Theory and Applications, Taipei, Taiwan, Oral Presentation, **2014**.

**Huang, T. Y.;** Lin, Y. S. A First Glance at Application of Qualitative Fire Risk Analysis of Life Casualties in Building Fires. Proceedings from the 2013 Taiwan Police College Seminar on Fire Safety Theory and Applications, Taipei, Taiwan, Oral Presentation, **2013**.

## **PROFESSIONAL MEMBERSHIPS**

### **American Academy of Forensic Science (AAFS)**

Associate Member of the Criminalistics Section, 2020-present.

### **American Chemical Society (ACS)**

Student Member, 2021-2024.