



HWAKONG CHENG, P.E.

PRINCIPAL

As a Principal at Taylor Engineering, Mr. Cheng's work includes HVAC design, commissioning and energy analysis. He is an expert in HVAC controls and has led and consulted on the controls design on dozens of projects, including laboratories, data centers, ice storage, and large chilled water plants. He has extensive experience commissioning both new construction as well as existing buildings and is highly proficient with energy modeling and analysis. His modeling work includes life cycle analysis, LEED, support of building energy code updates, and tool creation for evaluating advanced energy efficiency measures. In addition to his work as a consulting engineer, he is also actively involved in primary research ranging from advanced control strategies to radiant system design. He has numerous publications and has given several seminars on topics including energy efficient laboratory design and commissioning.

EDUCATION

Sc.B. Chemical Engineering,
Brown University, 1999

M.S. Civil Engineering,
University of Colorado
Boulder (Building Systems),
2006

REGISTRATIONS

Mechanical Engineer,
California #38188
Washington #49362

AFFILIATIONS

American Society of Heating,
Refrigeration, and Air-
Conditioning Engineers

International Institute for
Sustainable Laboratories
United States Green Building
Council

Shoreline Community
College, Clean Energy
Technology Program,
Advisory Committee
Member

YEARS OF EXPERIENCE

19 years total
12 years with Taylor

HONORS AND AWARDS

ASHRAE Technology Award for 555 County Center, Existing
Commercial, Puget Sound Chapter, 2017, Region XI 2018
Journal Paper Award, ASHRAE Journal, 2010
Engineering Excellence Fund Grant, University of Colorado, 2006
University Fellowship, University of Colorado, 2006
Honorable Mention, Graduate Research Fellowship Program,
National Science Foundation, 2005

SELECTED PUBLICATIONS

Raftery, P., S. Li, B. Jin, M. Ting, G. Paliaga, H. Cheng. *Design and evaluation of a cost-based supply air temperature reset strategy in an office building*. Energy and Buildings, 158, 2017: 356-370.

ASHRAE RP-1747 Implementation of RP-1547 CO₂-based Demand Controlled Ventilation for Multiple Zone HVAC Systems in Direct Digital Control Systems, ASHRAE Research Report, September 2017.

Kaam, S., P. Raftery, H. Cheng, G. Paliaga. *Time-averaged ventilation for optimized control of variable-air-volume systems*. Energy and Buildings, 139, 2017: 465-475.

Vargas, S. and H. Cheng. *Optimizing Laboratory Ventilation: Approaches to Estimating Economic Potential*. Presented at International Institute for Sustainable Laboratories, Kansas City, October 2016.



Taylor, S., J. Stein, G. Paliaga, H. Cheng. *Dual Maximum VAV Box Control Logic*. ASHRAE Journal, 54 (12), 2012: 16-24.

Taylor, S., H Cheng. *Economizer High Limit Controls and Why Enthalpy Economizers Don't Work*, ASHRAE Journal, 52 (11), 2010.

Henze, G.P., A.R. Florita, M.J. Brandemuehl, C. Felsmann, H. Cheng. *Advances in Near-Optimal Control of Passive Building Thermal Storage*. Journal of Solar Energy Engineering, 132 (2), 2010.

Cheng, H., M.J., Brandemuehl, G.P. Henze, A.R. Florita, C. Felsmann. *Evaluation of the Primary Factors Impacting the Optimal Control of Passive Thermal Storage (1313-RP)*. ASHRAE Transactions, 114 (2), 2008

Henze, G.P., C. Felsmann, A.R. Florita, M.J. Brandemuehl, H. Cheng, C.E. Waters. *Optimization of Building Thermal Mass Control in the Presence of Energy and Demand Charges (1313-RP)*, ASHRAE Transactions, 114 (2), 2008: 74-84.

RP-1313 - Evaluation of Building Thermal Mass Savings, ASHRAE Research Report, September 2007

PROFESSIONAL ASSOCIATIONS

ASHRAE

Member: 2004 - present

Technical Committee 1.4 Control Theory & Application: 2017 - present

Guideline Project Committee 36 High Performance Sequences of Operation for HVAC Systems:
2018 - present

International Institute for Sustainable Laboratories

Member: 2016 - present

Shoreline Community College

Advisory Committee Member, Clean Energy Technology Program: 2015 - present

REPRESENTATIVE PROJECTS

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| 505 Montgomery | San Francisco, CA, 330,000 ft ² , HVAC control retrofit and Cx |
| 455 County Center | Redwood City, CA, 116,000 ft ² , TI HVAC design and Cx |
| 555 County Center | Redwood City, CA, 140,000 ft ² , HVAC control retrofit and Cx |
| Alameda County Juvenile Facility | Alameda, CA, 380,000 ft ² , LEED NC Gold |
| Caltech (several locations) | Pasadena, CA, 400,000 ft ² , RCx of several buildings |
| Caltech South Mudd | Pasadena, CA, 80,000 ft ² , HVAC and control system retrofit |
| CSU Maritime Simulation Center | Vallejo, CA, 21,000 ft ² , Cx |
| CSU Maritime Dining Center | Vallejo, CA, 36,000 ft ² , Cx |
| EDR Guidelines | Development of design guides for PG&E |
| Fort Gordon Corps of Engineers | Fort Gordon, GA, Energy analysis |
| Gap Pleasanton | Pleasanton, CA, 180,000 ft ² , HVAC and control design |
| Hewlett Foundation | Menlo Park, CA, HVAC control upgrade of ice storage plant |



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| Hills Plaza (345 Spear, 2 Harrison) | San Francisco, CA, 1,000,000 ft ² , HVAC control retrofit |
| KLA Tencor | Milpitas, CA, 680,000 ft ² |
| Lawrence Berkeley Lab Building 2 | Berkeley, CA, HVAC investigative study |
| Letterman Digital Arts Center | San Francisco, CA, 900,000 ft ² , LEED NC Gold, Cx |
| Maguire Jail | Redwood City, CA, 217,000 ft ² , HVAC control retrofit and Cx |
| Maple St Correctional Facility | Redwood City, CA, 260,000 ft ² , HVAC control retrofit and Cx |
| NDA Data Centers | Various locations, HVAC control design and Cx |
| Oracle Pleasanton | Pleasanton, CA, 510,000 ft ² , LEED Silver, Analysis & Cx |
| San Francisco General Hospital | San Francisco, CA, 415,000 ft ² , LEED Gold, Energy analysis |
| San Mateo County Hall of Justice | Redwood City, CA, 320,000 ft ² , HVAC and control retrofit |
| San Mateo Medical Center | San Mateo, CA, 360,000 ft ² , HVAC control retrofit and Cx |
| San Quentin Central Health Center | San Quentin, CA, 115,000 ft ² , LEED NC Gold, Energy analysis |
| Stanford CCSR | Stanford, CA, 200,000 ft ² , Energy analysis of lab building |
| Stanford Green Earth Sciences | Stanford, CA, 80,000 ft ² , Analysis and HVAC control retrofit |
| Stanford Lab Energy Efficiency | Stanford, CA, Analysis of lab energy efficiency measures |
| Stanford Sapp Center (Old Chem) | Stanford, CA, 74,000 ft ² , HVAC design of lab building |
| Stanford Mitchell Earth Sciences | Stanford, CA, 104,000 ft ² Control retrofit of lab building |
| Symantec Springfield | Springfield, OR, 200,000 ft ² , LEED NC Gold |
| The Towers on Capitol Mall | Sacramento, CA, 1,700,000 ft ² |
| UC Berkeley Boalt Hall | Berkeley, CA, 30,000 ft ² , LEED CI Silver, HVAC retrofit |
| UC Berkeley Law South Addition | Berkeley, CA, 60,000 ft ² , LEED NC Gold, HVAC design |
| UC Davis Physics-Geology | Davis, CA, 116,000 ft ² , RCx of laboratory building |
| UC Merced Central Plant | Merced, CA, 400,000 ft ² , LEED NC Silver, Cx |
| UCM Kolligian Library (LITC) | Merced, CA, 180,000 ft ² , LEED NC Gold, Cx |
| UCSF Mt Zion Osher Center | San Francisco, CA, 60,000 ft ² , LEED NC Silver, Cx |

Research Projects:

EPIC Best in Class: Demonstrating Scalable Operational Efficiency Through Optimized Controls Sequences and Plug and Play Solutions

ARPA-E SENSOR Quantification of HVAC Energy Savings for Occupancy Sensing in Buildings Through an Innovative Testing Methodology

EPIC Optimizing Radiant Systems for Energy Efficiency and Comfort

ASHRAE RP-1747 Implementation of RP-1547 CO₂-based Demand Controlled Ventilation for Multiple Zone HVAC Systems in Direct Digital Control Systems

PIER Changing the Rules: Innovative Low-Energy Occupant-Responsive HVAC Controls and Systems

U.S. DOD Environmental Security Technology Certification Program: Demonstration of Energy Savings in Commercial Buildings for Tiered Trim and Respond Method in Resetting Static Pressure for VAV Systems

ASHRAE RP-1313 Evaluation of Building Thermal Mass Savings