

## Asst. Prof. Hamza Salih Erden

### Personal Information

**Office Phone:** [+90 212 285 6648](tel:+902122856648)

**Email:** erdenh@itu.edu.tr

**Web:** <https://web.itu.edu.tr/erdenh>

**Address:** Bilişim Enstitüsü, Oda 213

### Biography

Dr. Hamza Salih Erden received his B.S. degree from Istanbul Technical University in Mechanical Engineering; M.S. and Ph.D. degrees from Syracuse University in Mechanical and Aerospace Engineering. He is now a faculty member at Istanbul Technical University, where he leads graduate-level teaching track and research program titled "Thermal Systems in Cloud Infrastructure" at the Informatics Institute. His current research is on the thermodynamic modeling and optimization of data center thermal environment and cooling infrastructure. As an active member of ASHRAE and ASME, Dr. Erden authored and co-authored more than 15 journals and conference papers and received 2015 ASHRAE Willis H. Carrier Award.

### Education Information

Doctorate, Syracuse University, Mechanical And Aerospace Engineering, United States Of America 2009 - 2013

Post Graduate, Syracuse University, Mechanical And Aerospace Engineering, United States Of America 2007 - 2009

Under Graduate, İstanbul Teknik Üniversitesi, Makine Fakültesi, Makine Mühendisliği Bölümü, Turkey 2002 - 2007

### Foreign Languages

English, C1 Advanced

### Dissertations

Doctorate, Experimental and analytical investigation of the transient thermal response of air cooled data centers, Syracuse University, Mechanical And Aerospace Engineering, 2013

### Research Areas

Technical Sciences, Mechanical Engineering, Energy, Thermodynamics, Heat and Mass Transfer, Heating, Refrigerating and Air Conditioning, Computational fluid dynamics, Thermal Systems

### Academic Titles / Tasks

Assistant Professor, İstanbul Teknik Üniversitesi, Bilişim Enstitüsü, Bilişim Uygulamaları Anabilim Dalı, 2018 - Continues

Assistant Professor, İstanbul Teknik Üniversitesi, Bilişim Enstitüsü, Bilişim Uygulamaları Anabilim Dalı, 2015 - 2018

## Courses

Veri Merkezi Altyapısı ve Enerji Verimliliği, Post Graduate, 2016 - 2017

## Advising Theses

Erden H. S. , Çadırcı S., Numerical investigation of CRAH bypass in the air-cooled data centers, Post Graduate, V.EBRAHIMPOUR(Student), 2019

Erden H. S. , Koç İ. M. , Türkiye iklim koşullarındaki veri merkezlerinin soğutulmasında ekonomizer kullanımının enerji tasarrufu ve ekonomik potansiyel değerlendirmesi, Post Graduate, O.GÖZCÜ(Student), 2019

Erden H. S. , Böke Y. E. , UHEM veri merkezi ısıl profilinin deneysel incelemesi ve CFD analizi, Post Graduate, İ.TÜRKMEN(Student), 2019

## Articles Published in Journals That Entered SCI, SSCI and AHCI Indexes

- I. **Experimental and Computational Investigations of the Thermal Environment in a Small Operational Data Center for Potential Energy Efficiency Improvements**  
Turkmen I., Mercan C. A. , Erden H. S.  
JOURNAL OF ELECTRONIC PACKAGING, vol.142, no.3, 2020 (Journal Indexed in SCI)
- II. **A parametric CFD study of computer room air handling bypass in air-cooled data centers**  
Ahmadi V. E. , Erden H. S.  
APPLIED THERMAL ENGINEERING, vol.166, 2020 (Journal Indexed in SCI)
- III. **Energy and economic assessment of major free cooling retrofits for data centers in Turkey**  
Gozcu O., Erden H. S.  
TURKISH JOURNAL OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCES, vol.27, no.3, pp.2197-2212, 2019 (Journal Indexed in SCI)
- IV. **Optimization of Enclosed Aisle Data Centers With Induced CRAH Bypass**  
Erden H. S. , Koz M., Yildirim M. T. , Khalifa H. E.  
IEEE TRANSACTIONS ON COMPONENTS PACKAGING AND MANUFACTURING TECHNOLOGY, vol.7, no.12, pp.1981-1989, 2017 (Journal Indexed in SCI)
- V. **Experimental Demonstration and Flow Network Model Verification of Induced CRAH Bypass for Cooling Optimization of Enclosed-Aisle Data Centers**  
Erden H. S. , Koz M., Yildirim M. T. , Khalifa H. E.  
IEEE TRANSACTIONS ON COMPONENTS PACKAGING AND MANUFACTURING TECHNOLOGY, vol.7, no.11, pp.1795-1803, 2017 (Journal Indexed in SCI)
- VI. **Determination of the Lumped-Capacitance Parameters of Air-Cooled Servers Through Air Temperature Measurements**  
Erden H. S. , Khalifa H. E. , SCHMIDT R. R.  
JOURNAL OF ELECTRONIC PACKAGING, vol.136, no.3, 2014 (Journal Indexed in SCI)
- VII. **A hybrid lumped capacitance-CFD model for the simulation of data center transients**  
ERDEN H. S. , KHALIFA H. E. , SCHMIDT R. R.  
Hvac&R Research, vol.20, pp.688-702, 2014 (Journal Indexed in SCI)
- VIII. **Energy and environmental assessment of on-site power and cooling for data centers**  
ERDEN H. S. , KHALIFA H. E.  
Hvac&R Research, vol.18, pp.51-66, 2012 (Journal Indexed in SCI)

## Articles Published in Other Journals

**I. Proposal for Standard Compact Server Model for Transient Data Center Simulations**

PARDEY Z., DEMETRIOU D. W. , ERDEN H. S. , VANGILDER J., KHALIFA H. E. , SCHMIDT R. R.  
ASHRAE Transactions, 2015 (Refereed Journals of Other Institutions)

**Refereed Congress / Symposium Publications in Proceedings**

**I. Thermal Profiling of a Small Operational Data Center**

Türkmen İ., Mercan C. A. , ERDEN H. S.

ASME 2019 International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems, Anaheim, California, United States Of America, 7 - 09 October 2019

**II. Investigation of CRAH Bypass for Air-Cooled Data Centers using Computational Fluid Dynamics**

Ahmadi V. E. , Erden H. S.

IEEE International Telecommunications Energy Conference (INTELEC), Torino, Italy, 7 - 11 October 2018

**III. Veri Merkezi Serbest Soğutma Sistemlerinin Türkiye'nin İklim Şartlarındaki Enerji Analizi**

GÖZCÜ O., ERDEN H. S.

1.Ulusal Bulut Bilişim ve Büyük Veri Sempozyumu B3S'17, Antalya, Turkey, 19 - 20 October 2017, pp.65-70

**IV. Investigation of induced CRAH bypass for air-cooled data centers using computational fluid dynamics**

Erden H. S.

25th International Conference on Software, Telecommunications and Computer Networks, SoftCOM 2017, Split, Croatia, 21 - 23 September 2017

**V. Worldwide energy analysis of major free cooling methods for data centers**

Gozcu O., ÖZADA B., CARFİ M. U. , Erden H. S.

16th IEEE InterSociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems, ITherm 2017, Florida, United States Of America, 30 May - 02 June 2017, pp.968-976

**VI. NUMERICAL INVESTIGATION OF THE MELTING OF A PHASE CHANGE MATERIAL IN A THERMAL STORAGE DEVICE WITH EMBEDDED AIR FLOW CHANNELS**

Koz M., Erden H. S. , Khalifa H. E.

ASME Summer Heat Transfer Conference, Washington, Kiribati, 10 - 14 July 2016

**VII. Experimental Investigation of CRAH Bypass for Enclosed Aisle Data Centers**

Erden H. S. , Yildirim M. T. , Koz M., Khalifa H. E.

15th IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (ITherm), Nevada, United States Of America, 31 May - 03 June 2016, pp.1293-1299

**VIII. Energy Assessment of CRAH Bypass for Enclosed Aisle Data Centers**

Erden H. S. , Yildirim M. T. , Koz M., Khalifa H. E.

15th IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (ITherm), Nevada, United States Of America, 31 May - 03 June 2016, pp.433-439

**IX. PARAMETER ESTIMATION FOR LUMPED CAPACITANCE MODELING OF CRAH UNITS DURING CHILLED WATER INTERRUPTION**

Erden H. S. , Khalifa H. E.

ASME International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems (InterPACK), San-Francisco, Costa Rica, 6 - 09 July 2015

**X. Development of an IT Equipment Lumped Capacitance Parameter Database for Transient Data Center Simulations**

DEMETRIOU D. W. , Erden H. S. , Khalifa H. E. , SCHMIDT R. R.

14th InterSociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (ITherm), Florida, United States Of America, 27 - 30 May 2014, pp.1330-1337

**XI. Energy Saving Potential of Low-Temperature Cooling of Computers**

Khalifa H. E. , Erden H. S. , de Rouge R. B.

14th InterSociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (ITherm),

Florida, United States Of America, 27 - 30 May 2014, pp.1121-1128

**XII. ASSESSMENT OF THE ENERGY PERFORMANCE OF COGENERATION SYSTEMS FOR POWERING AND COOLING DATA CENTERS**

Ringham D. C. , Rice D. J. , Granetz B. S. , Erden H. S. , Khalifa H. E. , SCHMIDT R. R.

ASME International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems, California, United States Of America, 16 - 18 July 2013

**XIII. TRANSIENT THERMAL RESPONSE OF SERVERS THROUGH AIR TEMPERATURE MEASUREMENTS**

Erden H. S. , Khalifa H. E. , SCHMIDT R. R.

ASME International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems, California, United States Of America, 16 - 18 July 2013

**XIV. ROOM-LEVEL TRANSIENT CFD MODELING OF RACK SHUTDOWN**

Erden H. S. , Khalifa H. E. , SCHMIDT R. R.

ASME International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems, California, United States Of America, 16 - 18 July 2013

**XV. DESIGN OF SIMULATED SERVER RACKS FOR DATA CENTER RESEARCH**

Smith J. F. , Abdelmaksoud W. A. , Erden H. S. , Dannenhoffer J. F. , Dang T. Q. , Khalifa H. E. , SCHMIDT R. R. , IYENGAR M.

ASME Pacific Rim Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Systems, MEMS and NEMS, Oregon, United States Of America, 6 - 08 July 2011, pp.415-417

**XVI. On Site Power Generation for Data Centers**

ERDEN H. S. , KHALIFA H. E.

IAQVEC 2010, 16 - 18 September 2010

**XVII. Energy analysis of dedicated outdoor air systems based on distributed environmental control in multi-zone buildings**

Erden H. S. , KHALIFA H. E.

9th International Healthy Buildings Conference and Exhibition, HB 2009, Syracuse, NY, United States Of America, 13 - 17 September 2009

## Supported Projects

Erden H. S. , TUBITAK Project, Türkiye İklim Koşullarındaki Veri Merkezlerinin Soğutulmasında Ekonomizer Kullanımının Enerji Tasarrufu ve Ekonomik Potansiyel Değerlendirmesi, 2016 - Continues

Erden H. S. , TUBITAK Project, CFD Analysis and Economic Assessment of CRAH Bypass Method for the Cooling Optimization of Data Centers, 2018 - 2020

Erden H. S. , MERCAN A., Türkmen İ., Project Supported by Higher Education Institutions, UHEM Veri Merkezi Isıl Profilinin Deneysel İncelemesi ve CFD Analizi, 2017 - 2020

Erden H. S. , Project Supported by Higher Education Institutions, Koridoru Kapatılmış Veri Merkezlerinde Klima Baypas Yönteminin Akış Ağı ve Enerji Sistem Modelleriyle İncelenmesi, 2016 - 2018

## Memberships / Tasks in Scientific Organizations

ASHRAE, Member, 2008 - Continues

ASME, Member, 2008 - Continues

## Scientific Refereeing

ASME Journal of Electronic Packaging, SCI Journal, May 2017

International Journal of Numerical Methods for Heat and Fluid Flow, Other Indexed Journal, January 2017

ASME Journal of Thermal Science and Engineering Applications, Other Indexed Journal, April 2016  
ASME Journal of Thermal Science and Engineering Applications, Other Indexed Journal, April 2016  
IEEE Transactions on Components, Packaging and Manufacturing Technology, SCI Journal, October 2015  
International Journal of Heat and Mass Transfer, SCI Journal, March 2015  
ASME Journal of Electronic Packaging, SCI Journal, December 2014  
ASME Journal of Electronic Packaging, SCI Journal, March 2014

## **Edit Congress and Symposium Activities**

B3S, Attendee, Antalya, Turkey, 2017  
SoftCOM 2017, Attendee, Split, Croatia, 2017  
ITHERM 2017, Attendee, Florida, United States Of America, 2017  
ITHERM 2016, Attendee, Nevada, United States Of America, 2016  
ASME InterPACK 2015, Attendee, California, United States Of America, 2015  
ITHERM 2014, Attendee, Florida, United States Of America, 2014  
ASHRAE Winter Meeting, Attendee, New York, United States Of America, 2014  
ASME InterPACK 2013, Attendee, California, United States Of America, 2013  
12th Annual Symposium on Environmental and Energy Systems, Attendee, New York, United States Of America, 2012  
11th Annual Symposium on Environmental and Energy Systems, Attendee, New York, United States Of America, 2011  
IAQVEC 2010, Attendee, New York, United States Of America, 2010  
Healthy Buildings 2009, Attendee, New York, United States Of America, 2009  
8th Annual Symposium on Environmental and Energy Systems, Attendee, New York, United States Of America, 2008

## **Citations**

Total Citations (WOS):62  
h-index (WOS):5