

## Assoc. Prof. BURAK MARKAL

### Personal Information

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### Education Information

Doctorate, Karadeniz Technical University, Fen Bilimleri Enstitüsü, Makina Mühendisliği Anabilim Dalı, Turkey 2010 - 2016

Postgraduate, Karadeniz Technical University, Fen Bilimleri Enstitüsü, Makina Mühendisliği Anabilim Dalı, Turkey 2007 - 2010

Undergraduate, Karadeniz Technical University, Mühendislik Fakültesi, Makina Mühendisliği Bölümü, Turkey 2003 - 2007

### Foreign Languages

English, C1 Advanced

### Dissertations

Doctorate, Mikrokanallarda Kaynamalı Akışın Deneysel İncelenmesi , Karadeniz Technical University, Fen Bilimleri Enstitüsü, Makina Mühendisliği Bölümü / Termodinamik Bilim Dalı, 2016

Postgraduate, Ranque-Hilsch Vorteks Tüpünde Enerji Ayrışmasının Deneysel ve Termodinamik İncelenmesi, Karadeniz Technical University, Fen Bilimleri Enstitüsü, Makina Mühendisliği Bölümü / Termodinamik Bilim Dalı, 2010

### Research Areas

Mechanical Engineering, Energy, Fluid Mechanics, Thermodynamics, Heat and Mass Transfer, Engineering and Technology

### Academic Titles / Tasks

Associate Professor, Recep Tayyip Erdogan University, Mühendislik Ve Mimarlık Fakültesi, Makine Mühendisliği, 2020 - Continues

Associate Professor, Recep Tayyip Erdogan University, Mühendislik Fakültesi, Enerji Sistemleri Mühendisliği Bölümü, 2019 - 2020

Assistant Professor, Recep Tayyip Erdogan University, Mühendislik Fakültesi, Enerji Sistemleri Mühendisliği Bölümü, 2017 - 2019

Research Assistant, Karadeniz Technical University, Mühendislik Fakültesi, Makina Mühendisliği Bölümü, 2007 - 2009

## ARTICLES PUBLISHED IN JOURNALS THAT ENTERED SCI, SSCI AND AHCI INDEXES

- I. **Effect of double cross sectional ratio on performance characteristics of pulsating heat pipes**  
MARKAL B., CANDAN CANDERE A., AVCI M., AYDIN O.  
INTERNATIONAL COMMUNICATIONS IN HEAT AND MASS TRANSFER, vol.127, 2021 (Journal Indexed in SCI)
- II. **Investigation of flat plate type pulsating heat pipes via flow visualization-assisted experiments: Effect of cross sectional ratio**  
Markal B., Candere A., Avci M., Aydm O.  
INTERNATIONAL COMMUNICATIONS IN HEAT AND MASS TRANSFER, vol.125, 2021 (Journal Indexed in SCI)
- III. **The combined effects of filling ratio and inclination angle on thermal performance of a closed loop pulsating heat pipe**  
Markal B., Aksoy K.  
HEAT AND MASS TRANSFER, vol.57, no.5, pp.751-763, 2021 (Journal Indexed in SCI)
- IV. **Investigation of the effects of miscible and immiscible binary fluids on thermal performance of pulsating heat pipes**  
MARKAL B., Varol R.  
HEAT AND MASS TRANSFER, 2021 (Journal Indexed in SCI)
- V. **Experimental investigation and force analysis of flat-plate type pulsating heat pipes having ternary mixtures**  
Markal B., Varol R.  
INTERNATIONAL COMMUNICATIONS IN HEAT AND MASS TRANSFER, vol.121, 2021 (Journal Indexed in SCI)
- VI. **Conical coaxial impinging air jets: angle effect on the heat transfer performance**  
Markal B., Avci M., AYDIN O.  
HEAT AND MASS TRANSFER, vol.56, no.12, pp.3135-3146, 2020 (Journal Indexed in SCI)
- VII. **Thermal investigation and flow pattern analysis of a closed-loop pulsating heat pipe with binary mixtures**  
Markal B., Varol R.  
JOURNAL OF THE BRAZILIAN SOCIETY OF MECHANICAL SCIENCES AND ENGINEERING, vol.42, 2020 (Journal Indexed in SCI)
- VIII. **Flow boiling characteristics in a novel minichannel with a step on each corner**  
Markal B., Candan A., AYDIN O.  
EXPERIMENTAL HEAT TRANSFER, vol.33, no.1, pp.1-17, 2020 (Journal Indexed in SCI)
- IX. **Prediction of Two-Phase Heat Transfer Coefficient of Flow Boiling in Minichannels**  
Markal B., Candan A., AYDIN O., Avci M.  
HEAT TRANSFER ENGINEERING, vol.41, no.1, pp.17-35, 2020 (Journal Indexed in SCI)
- X. **The effect of Total flowrate on the cooling performance of swirling coaxial impinging jets**  
Markal B.  
HEAT AND MASS TRANSFER, vol.55, no.11, pp.3275-3288, 2019 (Journal Indexed in SCI)
- XI. **Effect of hydraulic diameter on flow boiling in rectangular microchannels**  
Markal B., AYDIN O., Avci M.  
HEAT AND MASS TRANSFER, vol.55, no.4, pp.1033-1044, 2019 (Journal Indexed in SCI)
- XII. **Prediction of Pressure Drop for Flow Boiling in Rectangular Multi-Microchannel Heat Sinks**  
Markal B., AYDIN O., Avci M.  
HEAT TRANSFER ENGINEERING, vol.40, pp.26-38, 2019 (Journal Indexed in SCI)
- XIII. **Experimental investigation of flow boiling in single minichannels with low mass velocities**  
Markal B., Candan A., AYDIN O., Avci M.  
INTERNATIONAL COMMUNICATIONS IN HEAT AND MASS TRANSFER, vol.98, pp.22-30, 2018 (Journal Indexed in SCI)
- XIV. **Experimental investigation of heat transfer characteristics and wall pressure distribution of swirling coaxial confined impinging air jets**  
Markal B.  
INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER, vol.124, pp.517-532, 2018 (Journal Indexed in SCI)
- XV. **Experimental investigation of coaxial impinging air jets**

- Markal B., AYDIN O.  
APPLIED THERMAL ENGINEERING, vol.141, pp.1120-1130, 2018 (Journal Indexed in SCI)
- XVI. **Saturated flow boiling characteristics in single rectangular minichannels: effect of aspect ratio**  
Candan A., Markal B., AYDIN O., Avci M.  
EXPERIMENTAL HEAT TRANSFER, vol.31, no.6, pp.531-551, 2018 (Journal Indexed in SCI)
- XVII. **EXPERIMENTAL STUDY OF SINGLE-PHASE FLUID FLOW AND HEAT TRANSFER CHARACTERISTICS IN RECTANGULAR MICROCHANNELS**  
Markal B., AYDIN O., Avci M.  
ISI BILIMI VE TEKNIGI DERGISI-JOURNAL OF THERMAL SCIENCE AND TECHNOLOGY, vol.38, no.1, pp.65-72, 2018 (Journal Indexed in SCI)
- XVIII. **Prediction of Heat Transfer Coefficient in Saturated Flow Boiling Heat Transfer in Parallel Rectangular Microchannel Heat Sinks: An Experimental Study**  
Markal B., AYDIN O., Avci M.  
HEAT TRANSFER ENGINEERING, vol.38, no.16, pp.1415-1428, 2017 (Journal Indexed in SCI)
- XIX. **An experimental investigation of saturated flow boiling heat transfer and pressure drop in square microchannels**  
Markal B., AYDIN O., Avci M.  
INTERNATIONAL JOURNAL OF REFRIGERATION-REVUE INTERNATIONALE DU FROID, vol.65, pp.1-11, 2016 (Journal Indexed in SCI)
- XX. **Effect of aspect ratio on saturated flow boiling in microchannels**  
Markal B., AYDIN O., Avci M.  
INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER, vol.93, pp.130-143, 2016 (Journal Indexed in SCI)
- XXI. **An experimental study on the decaying swirl flow in a tube**  
AYDIN O., Avci M., Markal B., YAZICI M.  
INTERNATIONAL COMMUNICATIONS IN HEAT AND MASS TRANSFER, vol.55, pp.22-28, 2014 (Journal Indexed in SCI)
- XXII. **Using artificial neural network for predicting performance of the Ranque-Hilsch vortex tube**  
Korkmaz M. E. , GÜMÜŞEL L., Markal B.  
INTERNATIONAL JOURNAL OF REFRIGERATION-REVUE INTERNATIONALE DU FROID, vol.35, no.6, pp.1690-1696, 2012 (Journal Indexed in SCI)
- XXIII. **Exergy analysis of a counter-flow Ranque-Hilsch vortex tube having different helical vortex generators**  
Markal B., AYDIN O., Avci M.  
INTERNATIONAL JOURNAL OF EXERGY, vol.10, no.2, pp.228-238, 2012 (Journal Indexed in SCI)
- XXIV. **A new vortex generator geometry for a counter-flow Ranque-Hilsch vortex tube**  
AYDIN O., Markal B., Avci M.  
APPLIED THERMAL ENGINEERING, vol.30, no.16, pp.2505-2511, 2010 (Journal Indexed in SCI)
- XXV. **An experimental study on the effect of the valve angle of counter-flow Ranque-Hilsch vortex tubes on thermal energy separation**  
Markal B., AYDIN O., Avci M.  
EXPERIMENTAL THERMAL AND FLUID SCIENCE, vol.34, no.7, pp.966-971, 2010 (Journal Indexed in SCI)

## Articles Published in Other Journals

- I. **Dönmeli Eş-Eksenli Hava Jetinin Isıl Davranışının Yakın Çarpma Mesafeleri için Deneysel Olarak İncelenmesi**  
MARKAL B.  
Uluslararası Mühendislik Araştırma ve Geliştirme Dergisi, vol.12, no.2, pp.443-453, 2020 (Other Refereed National Journals)
- II. **Dönmeli Eş Eksenli Çarpan Jetlerde Isı Transferinin Deneysel İncelenmesi**

MARKAL B., AYDIN O.

Tesisat Mühendisliği, no.175, pp.39-45, 2020 (Other Refereed National Journals)

**III. Kare Kesitli Mikrokanallarda Doymuş Kaynamalı Akış Karakteristiklerinin Deneysel İncelenmesi**

MARKAL B., AYDIN O., AVCI M.

Mühendis ve Makina, vol.60, no.694, pp.50-66, 2019 (Other Refereed National Journals)

**IV. Çarpan Eş Eksenli Bir Hava Jetinde Debi Oranının Akış Karakteristikleri Üzerine Etkisinin Deneysel Olarak İncelenmesi**

MARKAL B.

Gümüşhane Üniversitesi Fen Bilimleri Enstitüsü Dergisi, vol.8, no.2, pp.239-248, 2018 (National Refreed University Journal)

**V. Minikanallarda Doymuş Kaynamalı Akış Karakteristiklerinin Deneysel İncelenmesi**

CANDAN A., MARKAL B., AYDIN O., AVCI M.

Tesisat Mühendisliği, no.164, pp.29-38, 2018 (Other Refereed National Journals)

## **Refereed Congress / Symposium Publications in Proceedings**

**I. Effect of Filling Ratio on Thermal Performance of a Non-uniform Pulsating Heat Pipe**

MARKAL B., VAROL R.

International Conference on Energy, Environment and Storage of Energy (Iceesen 2020), Kayseri, Turkey, 19 - 21 November 2020, pp.206-213

**II. Effect of Mixing Ratio of Binary Mixtures on Heat Transfer Characteristics of a Pulsating Heat Pipe**

MARKAL B., VAROL R.

International 2nd Conference on Sustainable Energy and Energy Calculations (ICSEEC2020), İstanbul, Turkey, 4 - 05 September 2020, pp.53-62

**III. HEAT TRANSFER BEHAVIOR OF COAXIAL IMPINGING JETS: AN EXPERIMENTAL STUDY**

MARKAL B., AYDIN O.

22nd Congress on Thermal Science and Technology, Kocaeli, Turkey, 11 - 14 September 2019

**IV. Konutlarda Yağmur Suyu Potansiyelinden Faydalanma**

VAROL R., MARKAL B.

4th INTERNATIONAL ENERGY ENGINEERING CONGRESS 2019 (UEMK 2019), Gaziantep, Turkey, 24 - 25 October 2019, pp.1109-1117

**V. A FLOW DYNAMIC INVESTIGATION OF JET IMPINGEMENT WITH SWIRLING COAXIAL FORM**

MARKAL B.

The International Conference on Materials Science, Mechanical and Automotive Engineerings and Technology (IMSMATEC'19), Nevşehir, Turkey, 21 - 23 June 2019, pp.451-456

**VI. The Effect of Jet Impingement on the Performance of a Photovoltaic Module**

MARKAL B., VAROL R.

3rd International Symposium on Innovative Approaches in Scientific Studies, Ankara, Turkey, 19 - 21 April 2019, pp.647-650

**VII. Dönmeli Eş Eksenli Çarpan Jetlerde Isı Transferinin Deneysel İncelenmesi**

MARKAL B., AYDIN O.

14. Ulusal Tesisat Mühendisliği Kongresi, İzmir, Turkey, 17 - 20 April 2019, pp.793-801

**VIII. Thermal Characteristics of Swirling Coaxial Confined Impinging Air Jets: An Experimental Investigation**

MARKAL B.

2nd International Symposium on Innovative Approaches in Scientific Studies, Samsun, Turkey, 30 November - 02 December 2018, vol.3, pp.66-71

**IX. Flow Characteristics of Swirling Coaxial Impinging Air Jets: An Experimental Investigation**

MARKAL B.

1. INTERNATIONAL TECHNOLOGICAL SCIENCES AND DESIGN SYMPOSIUM, Giresun, Turkey, 27 - 29 June 2018,

pp.782-795

- X. **EXPERIMENTAL INVESTIGATION OF THE EFFECT OF FILLING RATIO AND INCLINATION ANGLE ON THE HEAT PIPE PERFORMANCE**  
MARKAL B., AKSOY K.  
III. ULUSLARARASI MESLEKİ VE TEKNİK BİLİMLER KONGRESİ, Gaziantep, Turkey, 21 - 22 June 2018, pp.284-291
- XI. **Effects of Flowrate Ratio and Nozzle-to-plate Distance on the Hydrodynamic Characteristics of Impinging Coaxial Jets**  
MARKAL B.  
7th International Conference on Advanced Technologies (ICAT'18), Antalya, Turkey, 28 April - 01 May 2018, pp.832-839
- XII. **KESİTİ T-ŞEKLİNDE OLAN TEK BİR MİNİ KANALDA DOYMUŞ KAYNAMALI AKIŞ KARAKTERİSTİKLERİNİN DENEYSEL İNCELENMESİ**  
MARKAL B., CANDAN A., AYDIN O.  
4. Uluslararası Katılımlı Anadolu Enerji Sempozyumu (AES 2018), Edirne, Turkey, 18 - 20 April 2018, pp.561-572
- XIII. **Yenilikçi Soğutma Teknolojileri: Isı Boruları**  
MARKAL B., AKSOY K.  
1st International Symposium on Innovative Approaches in Scientific Studies (ISAS 2018), Antalya, Turkey, 11 - 13 April 2018, vol.2, pp.336-342
- XIV. **Flow Boiling Characteristics in a Single Rectangular Microchannel**  
MARKAL B., CANDAN A., AYDIN O., AVCI M.  
8th International Advanced Technologies Symposium (IATS217), 19 - 22 October 2017, pp.2075-2081
- XV. **Mikro boyutlu dikdörtgenel kanallarda kaynamalı akışın deneysel incelenmesi**  
MARKAL B., AYDIN O., AVCI M.  
VIII. Ulusal Hidrolik Pnömatik Kongresi, Turkey, 22 - 25 November 2017
- XVI. **MİKRO BOYUTLU DİKDÖRTGENSEL KANALLARDA KAYNAMALI AKIŞIN DENEYSEL İNCELENMESİ**  
MARKAL B., AYDIN O., AVCI M.  
VIII. ULUSAL HİDROLİK PNÖMATİK KONGRESİ, İzmir, Turkey, 22 - 25 November 2017, pp.491-498
- XVII. **Flow Boiling Characteristics in a Single Rectangular Minichannel**  
MARKAL B., CANDAN A., AYDIN O., AVCI M.  
8th International Advanced Technologies Symposium (IATS'17), Elazığ, Turkey, 19 - 22 October 2017, pp.2075-2081
- XVIII. **KARE KESİTLİ MİNİ BİR KANAL İÇERİSİNDE KAYNAMALI AKIŞIN DENEYSEL İNCELENMESİ**  
CANDAN A., MARKAL B., AYDIN O., AVCI M.  
ULIBTK'17 21. Ulusal Isı Bilimi ve Tekniği Kongresi, Çorum, Turkey, 13 - 16 September 2017, pp.313-321
- XIX. **Minikanallarda Doymuş Kaynamalı Akış Karakteristiklerinin Deneysel İncelenmesi**  
CANDAN A., MARKAL B., AYDIN O., AVCI M.  
13. Ulusal Tesisat Mühendisliği Kongresi, Turkey, 19 - 22 April 2017
- XX. **Kare kesitli mikrokanallarda doymuş kaynamalı akış karakteristiklerinin deneysel incelenmesi**  
MARKAL B., AYDIN O., AVCI M.  
13. Ulusal Tesisat Mühendisliği Kongresi, Turkey, 19 - 22 April 2017
- XXI. **Kare kesitli mikrokanallarda doymuş kaynamalı akış karakteristiklerinin deneysel incelenmesi**  
MARKAL B., AYDIN O., AVCI M.  
13. Ulusal Tesisat Mühendisliği Kongresi, İzmir, Turkey, 19 - 22 April 2017, pp.1433-1442
- XXII. **Minikanallarda doymuş kaynamalı akış karakteristiklerinin deneysel incelenmesi**  
CANDAN A., MARKAL B., AYDIN O., AVCI M.  
13. Ulusal Tesisat Mühendisliği Kongresi, İzmir, Turkey, 19 - 22 April 2017, pp.1483-1494
- XXIII. **Kare kesitli mini bir kanal içerisinde kaynamalı akışın deneysel incelenmesi**  
CANDAN A., AVCI M., MARKAL B., AYDIN O.  
21. Ulusal Isı Bilimi ve Tekniği Kongresi, Turkey, 13 - 16 April 2017
- XXIV. **Paralel mikro kanallı ısı alıcıda kaynamalı akış karakteristiklerinin deneysel olarak incelenmesi**  
MARKAL B., AYDIN O., AVCI M.

20. Ulusal Isı Bilimi ve Tekniđi Kongresi 2015 (ULIBTK'15), Turkey, 2 - 05 September 2015

XXV. **Paralel mikro kanallı ısı alıcıda kaynamalı akış karakteristiklerinin deneysel olarak incelenmesi**  
MARKAL B., AYDIN O., AVCI M.

ULIBTK'15 20. Isı Bilimi ve Tekniđi Kongresi, Balıkesir, Turkey, 2 - 05 September 2015, pp.85-95

XXVI. **Ortam sıcaklıđı ve yalıtımın Ranque-Hilsch vorteks tñpñ performansı üzerindeki etkisinin deneysel olarak incelenmesi**

MARKAL B., AYDIN O., AVCI M.

ULIBTK'13 19. Ulusal Isı Bilimi ve Tekniđi Kongresi, Samsun, Turkey, 9 - 12 September 2013, pp.905-910

## Supported Projects

Markal B., Avcı M., TUBITAK Project, Kademeli Geniřleyen Akış Kesitine Sahip Mikro Pim Tipi Kanatçıklı Isı Alıcılarda Kaynamalı Akışın Deneysel İncelenmesi, 2020 - 2023

Markal B., Avcı M., TUBITAK Project, Deđişken Kanal Geniřliğine Sahip Düz Plakalı Kapalı Döngümlü Atımlı Isı Borularının Deneysel İncelenmesi, 2018 - 2020

Aydın O., Avcı M., TUBITAK Project, Mikrokanal Akışlarında Kaynamada Isı Transferi ve Sistem Parametrelerinin Deneysel olarak İncelenmesi, 2013 - 2016

## Patent

Avcı M., Markal B., Aydın O., Düz plakalı atımlı ısı borusu, Patent, CHAPTER F Mechanical engineering; Lighting; Heating; Weaponry; Destroyed Materials, The Invention Registration Number: TR 2017 23286 B , Initial Registration, 2020

## Scientific Refereeing

Applied Thermal Engineering, SCI Journal, July 2018

Applied Thermal Engineering, SCI Journal, June 2018

Applied Thermal Engineering, SCI Journal, March 2018

Open Access Library Journal, Other Indexed Journal, January 2018

Energy, SCI Journal, December 2017

ISH Journal of Hydraulic Engineering, Other Indexed Journal, October 2017

International Journal of Refrigeration, SCI Journal, October 2017

International Journal of Refrigeration, SCI Journal, September 2017

International Journal of Refrigeration, SCI Journal, August 2017

Alexandria Engineering Journal / Elsevier, SCI Journal, July 2017

International Journal of Refrigeration / Elsevier, SCI Journal, June 2017

Chemical Engineering Communications / Taylor & Francis, SCI Journal, April 2015

Energy / Elsevier, SCI Journal, March 2015

## Edit Congress and Symposium Activities

VIII. ULUSAL HİDROLİK PNÖMATİK KONGRESİ, Attendee, İzmir, Turkey, 2017

8th International Advanced Technologies Symposium (IATS'17), Attendee, Elazığ, Turkey, 2017

13. Ulusal Tesisat Mühendisliği Kongresi, Attendee, İzmir, Turkey, 2017

20. Isı Bilimi ve Tekniđi Kongresi (ULIBTK'15), Attendee, Balıkesir, Turkey, 2015

19. Ulusal Isı Bilimi ve Tekniđi Kongresi (ULIBTK'13), Attendee, Samsun, Turkey, 2013

## **Citations**

Total Citations (WOS):303

h-index (WOS):10

## **Awards**

MARKAL B., Karadeniz Teknik Üniversitesi Makina Mühendisliği Bölüm İkincisi, Karadeniz Teknik Üniversitesi, June 2007

MARKAL B., Karadeniz Teknik Üniversitesi Mühendislik Fakültesi Üçüncüsü, Karadeniz Teknik Üniversitesi, June 2007