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Education Information

Doctorate, University of Wisconsin-Madison, Eğitim Programları Ve Öğretim, United States Of America 2010 - 2015

Postgraduate, Middle East Technical University, Graduate School of Social Sciences, Fen Ve Matematik Eğitimi (YI) (Tezli), Turkey 2006 - 2008

Undergraduate Minor, Middle East Technical University, Faculty of Arts and Sciences, Department of Mathematics, Turkey 2003 - 2006

Undergraduate, Middle East Technical University, Faculty of Education, Matematik Ve Fen Bilimleri Eğitimi Bölümü, Turkey 2003 - 2006

Dissertations

Doctorate, An investigation of elementary teachers' proving eyes and ears, University Of Wisconsin-Madison, Eğitim Programları Ve Öğretim, 2015

Postgraduate, Teachers' perceived efficacy beliefs and perceptions regarding the implementation of the 2004 primary mathematics curriculum, Middle East Technical University, Graduate School of Social Sciences, Fen Ve Matematik Eğitimi (YI) (Tezli), 2008

Research Areas

Elementary School Education, Teacher Training in Science and Math. at Second. Sch. Lev.

Academic Titles / Tasks

Assistant Professor, Middle East Technical University, Faculty of Education, Mathematics and Science Education, 2016 - Continues

Courses

Independent Study in Mathematics Education, Postgraduate, 2018 - 2019

Advising Theses

- İşler Baykal I., PRE-SERVICE MIDDLE SCHOOL MATHEMATICS TEACHERS' MATHEMATICAL KNOWLEDGE FOR TEACHING IN THE CONTEXT OF FUNCTIONAL THINKING, Postgraduate, Z.KÜBRA(Student), 2024
- İşler Baykal I., INVESTIGATING DEVELOPMENT OF EIGHT GRADE STUDENTS'FUNCTIONAL THINKING THROUGH A SIMCALC MATHWORLDSINTEGRATED TEACHING EXPERIMENT, Postgraduate, K.TAN(Student), 2024
- İşler Baykal I., EXAMINING MIDDLE SCHOOL MATHEMATICS TEACHERS' PEDAGOGICAL CONTENT KNOWLEDGE IN THE CONTEXT OF FUNCTIONAL THINKING, Postgraduate, R.İŞSEVER(Student), 2024
- İşler Baykal I., Investigating mathematics teachers' covariational reasoning and its relation to their knowledge of and teaching quadratic functions, Doctorate, M.BELİN(Student), 2024
- İşler Baykal I., Examining prospective elementary and middle school mathematics teachers' mathematics anxiety and mathematics teaching anxiety, Postgraduate, F.NUR(Student), 2024
- İşler Baykal I., Investigating a mathematics teacher and his eighth-grade students' proof evaluations, Postgraduate, H.İBRAHİM(Student), 2023
- İŞLER BAYKAL I., Investigating prospective middle school mathematics teachers' self-efficacy perceptions of online teaching during practice teaching course, Postgraduate, Ş.YAZAR(Student), 2022
- İŞLER BAYKAL I., Investigating fifth-grade students' functional thinking processes through a game-based learning activity, Postgraduate, T.ARSLANDAŞ(Student), 2022
- İŞLER BAYKAL I., An investigation of development of prospective elementary teachers' knowledge to teach algebra in early grades through case discussions, Postgraduate, N.ÖZTÜRK(Student), 2021
- İŞLER BAYKAL I., The effect of using game-based learning activities in algebra on seventh-grade students' algebra achievement, attitude towards mathematics and opinions about game-based learning activities, Postgraduate, Z.İŞİLAY(Student), 2021
- İŞLER BAYKAL I., The effects of a functional thinking intervention on fifth grade students' functional thinking skills, Postgraduate, G.Akın(Student), 2020
- İŞLER BAYKAL I., Investigating middle school preservice mathematics teachers' conceptions of algebra and knowledge of task purposes and student thinking, Postgraduate, B.ALAPALA(Student), 2018

Published journal articles indexed by SCI, SSCI, and AHCI

- I. **Development of prospective elementary teachers' knowledge to teach early algebra through case discussions**
Öztürk-Tavşan N., İŞLER BAYKAL I.
Journal of Mathematics Teacher Education, 2024 (SSCI)
- II. **Does Early Algebra Matter? The Effectiveness of an Early Algebra Intervention in Grades 3 to 5**
Blanton M., Stroud R., Stephens A., Gardiner A. M., Stylianou D. A., Knuth E., İŞLER BAYKAL I., Strachota S.
AMERICAN EDUCATIONAL RESEARCH JOURNAL, vol.56, no.5, pp.1930-1972, 2019 (SSCI)
- III. **Growth in children's understanding of generalizing and representing mathematical structure and relationships**
Blanton M., İŞLER BAYKAL I., Stroud R., Stephens A., Knuth E., Gardiner A. M.
EDUCATIONAL STUDIES IN MATHEMATICS, vol.102, no.2, pp.193-219, 2019 (SSCI)
- IV. **Developing a Learning Progression for Curriculum, Instruction, and Student Learning: An Example from Mathematics Education**
Fonger N. L., Stephens A., Blanton M., İşler Baykal I., Knuth E., Gardiner A. M.
COGNITION AND INSTRUCTION, vol.36, pp.30-55, 2018 (SSCI)
- V. **Implementing a Framework for Early Algebra**
Blanton M., Brizuela B. M., Stephens A., Knuth E., Isler I., Gardiner A. M., Stroud R., Fonger N. L., Stylianou D.
TEACHING AND LEARNING ALGEBRAIC THINKING WITH 5- TO 12-YEAR-OLDS: THE GLOBAL EVOLUTION OF AN EMERGING FIELD OF RESEARCH AND PRACTICE, pp.27-49, 2018 (SSCI)
- VI. **A Learning Progression for Elementary Students' Functional Thinking**

Stephens A. C., Fonger N., Strachota S., İŞLER BAYKAL I., Blanton M., Knuth E., Gardiner A. M.
MATHEMATICAL THINKING AND LEARNING, vol.19, no.3, pp.143-166, 2017 (SSCI)

VII. **The Development of Children s Algebraic Thinking The Impact of a Comprehensive Early Algebra Intervention in Third Grade**

Blanton M., Stephens A., Knuth E., Gardiner A., İşler I., Kim J.

Journal For Research In Mathematics Education, vol.46, pp.39-87, 2015 (SSCI)

Articles Published in Other Journals

- I. **The Effects of a Functional Thinking Intervention on Fifth-Grade Students' Functional Thinking**
Akin G., İŞLER BAYKAL I.
Hacettepe Egitim Dergisi, vol.39, no.1, pp.68-86, 2024 (ESCI)
- II. **The Effects of an Early Algebra Intervention on Third-Grade Students' Algebraic Thinking Skills***
İŞLER BAYKAL I., ÖZTÜRK TAVŞAN N., Güzeller G., Saygılı I.
CUKUROVA UNIVERSITY FACULTY OF EDUCATION JOURNAL, vol.52, no.3, pp.758-799, 2023 (ESCI)
- III. **Middle School Pre-Service Mathematics Teachers' Opinions related to Mathematics Education for Sustainability**
SEMİZ G. K., İŞLER BAYKAL I.
EURASIAN JOURNAL OF EDUCATIONAL RESEARCH, vol.2020, no.89, pp.111-136, 2020 (ESCI)
- IV. **Just Say Yes to Early Algebra**
Stephens A., Blanton M., Knuth E., İŞLER I., Murphy Gardiner A.
Teaching Children Mathematics, vol.22, no.2, pp.92, 2015 (Peer-Reviewed Journal)
- V. **The String Task Not Just for High School**
İŞLER I., Marum T., Stephens A., Blanton M., Knuth E., Murphy Gardiner A.
Teaching Children Mathematics, vol.21, no.5, pp.282-292, 2015 (Peer-Reviewed Journal)
- VI. **Equation structure and the meaning of the equal sign: The impact of task selection in eliciting elementary students' understandings**
Stephens A. C., Knuth E. J., Blanton M. L., Isler I., Gardiner A. M., Marum T.
JOURNAL OF MATHEMATICAL BEHAVIOR, vol.32, no.2, pp.173-182, 2013 (ESCI)

Books & Book Chapters

- I. **İspat Etkinlikleri ve Sınıf İçi Uygulamaları**
Özgür Z., İşler Baykal I., Doğan M. F.
in: Matematik Eğitiminde Etkinlikler Ve Uygulamaları, Yüksel DEDE, Muhammed Fatih DOĞAN, Fatma ASLAN-TUTAK,
Editor, Pegem A Yayıncılık, Ankara, pp.415-438, 2020
- II. **İlkokulda cebir öğretimi**
İşler Baykal I.
in: İlkokul Matematik Öğretimi, Kamuran Tarım, Güney Hacıömeroğlu, Editor, Anı Yayıncılık, Ankara, pp.245-261,
2019
- III. **İlkokulda Cebir Öğretimi**
İŞLER BAYKAL I.
in: Matematik Öğretiminin Temelleri İlkokul, Kamuran Tarım, Güney Hacıömeroğlu, Editor, Anı Yayıncılık, Ankara,
pp.245-261, 2019
- IV. **Implementing a Framework for Early Algebra**
Blanton M., Brizuela B., Stephens A., Knuth E., İşler Baykal I., Gardiner A. M., Stroud R., Fonger N., Stylianos D.
in: Teaching and Learning Algebraic Thinking with 5- to 12-Year-Olds, ICME-13 Monographs, C. Kieran, Editor,
Springer, London/Berlin, Zug, pp.27-49, 2018

Refereed Congress / Symposium Publications in Proceedings

- I. **An investigation of two mathematics teachers' covariational reasoning**
Belin M., İşler Baykal I., Karagöz Akar G.
Thirteenth Congress of the European Society for Research in Mathematics Education (CERME13) , Budapest, Hungary, 10 - 14 July 2023, pp.3711-3718
- II. **Mathematics teachers' uses of resources in the context of teaching reasoning-and-proving: Insights from a cross-national study**
Çakıroğlu E., Kohanová I., İşler Baykal I., Slavíčková M., Di Paola B., Michal J., Høyenes S.
Thirteenth Congress of the European Society for Research in Mathematics Education (CERME13), Budapest, Hungary, 10 - 14 July 2023, pp.4109-4116
- III. **Questioning Strategies of a Prospective Middle School Mathematics Teacher Within Unexpected Situations**
Yılmaz A., İşler Baykal I.
6. Türk Bilgisayar ve Matematik Eğitimi Sempozyumu (TÜRKBİLMAT-6), Ankara, Turkey, 28 - 30 October 2023, pp.87-93
- IV. **Sınıf Öğretmeni Adaylarının Eşitlik Kavramına Yönelik Anlayışları**
Öztürk Tavşan N., İşler Baykal I.
6. Türk Bilgisayar ve Matematik Eğitimi Sempozyumu (TÜRKBİLMAT-6), Ankara, Turkey, 28 - 30 October 2023, pp.525-529
- V. **Matematik Öğretmenlerinin Verdikleri Örneklerde Belirlenen Akıl Yürütme Türleri ve Gösterimleri.**
İşler Baykal I., Çakıroğlu E.
6. Türk Bilgisayar ve Matematik Eğitimi Sempozyumu (TÜRKBİLMAT-6) , Ankara, Turkey, 28 - 30 October 2023, pp.437-439
- VI. **Undergraduate and Graduate Mathematics Education Students' Ways of Reasoning Addressed in Their Mathematics Lesson Plans**
İşler Baykal I., Erbasan E., Akyüz D.
X. International Eurasian Educational Research Congress (EJER 2023), Ankara, Turkey, 8 - 11 June 2023, pp.951-952
- VII. **A Preservice Middle School Mathematics Teacher's Conceptualization of Algebra Through Equivalence and Equations**
Alapala B., İşler Baykal I.
Annual Meeting of the American Education Research Association, Illinois, United States Of America, 13 - 16 April 2023
- VIII. **Developing an Integrated Framework For Analyzing Ways of Reasoning in Mathematics**
SEVİNÇ Ş., Kohanova I., ISIKSAL BOSTAN M., Kubacek Z., İŞLER BAYKAL I., Lada M., ÇAKIROĞLU E., di paola b.
15th annual International Conference of Education, Research and Innovation, Spain, 09 November 2022
- IX. **Investigating the characteristics of algebra tasks generated by preservice mathematics teachers**
Kaplan Can G., İşler Baykal I., Kabar M. G. D., Çakıroğlu E.
Twelfth Congress of the European Society for Research in Mathematics Education (CERME12), Bolzano, Italy, 2 - 05 February 2022, pp.2-9
- X. **Bir Fonksiyonel Düşünme Uygulamasının Beşinci Sınıf Öğrencilerinin Fonksiyonel Düşünme Becerilerine Etkileri.**
Akn G., İşler Baykal I.
5. Uluslararası Türk Bilgisayar ve Matematik Eğitimi (TÜRKBİLMAT-5), Antalya, Turkey, 28 - 30 October 2021, pp.58-61
- XI. **Üçüncü Sınıf Öğrencilerin Değişken Kullanımına İlişkin Becerilerinin Gelişimi.**
Öztürk Tavşan N., İşler Baykal I., Güzeller G., Saygılı İ.
14. Ulusal Fen Bilimleri ve Matematik Eğitimi Kongresi Özetler Kitabı, Burdur, Turkey, 19 - 21 May 2021, pp.62
- XII. **Ortaokul Matematik Öğretmenlerinin Kaynaştırma Eğitimine Yönelik Görüşleri**
Namlı Ş., İşler Baykal I.

14. Ulusal Fen Bilimleri ve Matematik Eğitimi Kongresi Özetler Kitabı, Burdur, Turkey, 19 - 21 May 2021, pp.245
- XIII. **Bir Erken Cebir Uygulamasının Üçüncü Sınıf Öğrencilerin Fonksiyonel Düşünme Becerilerine Etkisi**
Öztürk N., Güzeller G., Saygılı İ., İşler Baykal I.
EJERCONGRESS 2020, Eskişehir, Turkey, 10 - 13 September 2020, pp.591-600
- XIV. **The Effects Of Problem Solving Strategies On 5Th Grade Students' Problem Solving Achievement**
Kantar Ö., İşler Baykal I.
4. Uluslararası Türk Bilgisayar ve Matematik Eğitimi Sempozyumu, İzmir, Turkey, 26 - 28 September 2019, pp.665-667
- XV. **Üçüncü, Dördüncü ve Beşinci Sınıf Öğrencilerinin Eşit İşaretine Yönelik Algıları**
İşler Baykal I., Öztürk N., Yıldız İ., Güzeller G.
4. Uluslararası Türk Bilgisayar ve Matematik Eğitimi Sempozyumu, İzmir, Turkey, 26 - 28 September 2019, pp.1172-1178
- XVI. **Teachers' Conceptions of Algebra and Knowledge of Task Purposes**
Alapala B., İşler Baykal I.
Eleventh Congress of the European Society for Research in Mathematics Education, Utrecht, Netherlands, 6 - 11 February 2019, pp.532-533
- XVII. **Elementary pre-service mathematics teachers' conceptions of algebra**
Alapala B., İşler Baykal I.
Proceedings of the 42nd Conference of the International Group for the Psychology of Mathematics Education, Umea, Sweden, 3 - 08 July 2018, vol.5, pp.6
- XVIII. **İlköğretim Matematik Öğretmen Adaylarının Sürdürülebilirlik için Matematik Eğitimi Üzerine Görüşleri**
Karaarslan Semiz G., İşler Baykal I.
EJER, Antalya, Turkey, 2 - 05 May 2018, pp.1116-1117
- XIX. **The interplay between students' understandings of proportional and functional relationships**
Stephens A., Strachota S., Knuth E., Blanton M., İŞLER I., Gardiner A. M.
39th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics (PMENA), Indianapolis, United States Of America, 5 - 08 October 2017, pp.251-258
- XX. **Fostering Generalizations: a classroom discourse analysis**
Prough S., Strachota S., Veltri R., İŞLER I., Blanton M., Gardiner A. M., Knuth E., Stephens A.
39th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics (PMENA), Indianapolis, United States Of America, 5 - 08 October 2017, pp.287-290
- XXI. **Matematik performansında 4. sınıftan 8. sınıfa olan değişimler: TIMSS Türkiye verilerinin başarı ve bilişsel derinlik açısından incelenmesi**
ÇELİKDEMİR K., KAPLAN CAN G., İŞLER BAYKAL I., ÇAKIROĞLU E.
3. Türk Bilgisayar ve Matematik Eğitimi Sempozyumu, Turkey, 17 - 19 May 2017
- XXII. **Tracing mathematics-related belief change in teacher education programs**
Haser C., İşler I.
10th Congress of the European-Society-for-Research-in-Mathematics-Education (CERME), Dublin, Ireland, 1 - 05 February 2017, pp.1106-1113
- XXIII. **Grade 6 students' abilities to represent functional relationships**
İşler I., Strachota S., Stephens A., Fonger N., Blanton M., Gardiner A., Knuth E.
10th Congress of the European-Society-for-Research-in-Mathematics-Education (CERME), Dublin, Ireland, 1 - 05 February 2017, pp.432-439
- XXIV. **Analyzing generalizations through discourse**
Strachota S., İŞLER I., Fonger N., Blanton M., Gardiner A. M.
38th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, 3 - 06 November 2016
- XXV. **What are elementary teachers expectations regarding reasoning and proof in school mathematics**
İşler I.
13th International Congress on Mathematical Education, Hamburg, Germany, 24 - 31 July 2016

- XXVI. **A longitudinal study of elementary students use of variable notation to represent mathematical generalizations**
Blanton M., Gardiner A., İŞLER I., Stephens A., Knuth E.
Annual Meeting of the American Education Research Association, 8 - 12 April 2016
- XXVII. **Arithmetic Properties as a Route into Algebraic Reasoning**
Strachota S., İŞLER I., Kang H.
37th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, 5 - 08 November 2015, pp.263
- XXVIII. **A comparison of elementary and middle grades students algebraic reasoning**
İŞLER I., Blanton M., Murphy Gardiner A., Knuth E., Stephens A., Kang H.
Joint Meeting of PME 38 and PME-NA 36, 15 - 20 July 2014, vol.6, pp.110
- XXIX. **Third graders generalizations about even numbers and odd numbers The impact of an early algebra intervention**
İŞLER I., Stephens A., Murphy Gardiner A., Knuth E., Blanton M.
35th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, 14 - 17 November 2013, pp.140-143
- XXX. **Preservice teachers conceptions of algebra and knowledge of student thinking**
İŞLER I., Knuth E.
37th Conference of the International Group for the Psychology of Mathematics Education, 28 July - 02 August 2013, vol.5, pp.77
- XXXI. **Fourth grade students abilities to write algebraic expressions and equations**
İŞLER I., Marum T., Stephens A.
National Council of Teachers of Mathematics Research Presession, 15 - 17 April 2013
- XXXII. **From recursive pattern to correspondence rule Developing students abilities to engage in functional thinking**
Stephens A., İŞLER I., Marum T., Blanton M., Knuth E., Murphy Gardiner A.
Thirty-Fourth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, 1 - 04 November 2012, pp.821-828
- XXXIII. **Aligning early algebra learning progressions and assessments in grades 3 8**
Stephens A., Blanton M., Knuth E., Murphy Gardiner A., Marum T., İŞLER I.
National Council of Teachers of Mathematics Research Presession, 23 - 25 April 2012
- XXXIV. **Elementary students recognition of algebraic structure Not all tasks are created equal**
İŞLER I., Stephens A., Maria B., Knuth E., Marum T., Gardiner A.
Annual Meeting of the American Education Research Association, 13 - 17 April 2012
- XXXV. **From specific value to variable Developing students abilities to represent unknowns**
Marum T., İŞLER I., Stephens A., Gardiner A., Blanton M., Knuth E.
33rd Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, 20 - 23 October 2011, pp.106-113
- XXXVI. **DEVELOPING PRESERVICE TEACHERS KNOWLEDGE ON PATTERNS: CREATIVE DRAMA AS AN ALTERNATIVE APPROACH**
İŞLER BAYKAL I., İŞIKSAL BOSTAN M.
34th Conference of the International-Group-for-the-Psychology-of-Mathematics-Education, Belo Horizonte, Brazil, 18 - 23 July 2010, pp.47
- XXXVII. **Analysis of primary education between England and Turkey**
İŞLER I., HASER Ç.
XIV. World Congress of Comparative Education Societies, 16 - 18 June 2010
- XXXVIII. **Understanding preservice mathematics teachers beliefs The influence of initial teaching related courses**
İŞLER I., HASER Ç.
European Conference on Educational Research., 25 - 26 September 2009
- XXXIX. **Pre service teachers perceptions about the quality of their teacher education program**

ÇAKIROĞLU E., ÇAPA AYDIN Y., ÇAKIROĞLU J., İŞLER I.

16th International Conference on Learning, Barcelona, Spain, 1 - 04 July 2009

- XL. **Teachers efficacy beliefs and perceptions about a new curriculum based on their area of certification job satisfaction gender and participation of an in service training**

İŞLER I., ÇAKIROĞLU E.

16th International Conference on Learning, 1 - 04 July 2009

- XLI. **TEACHERS' EFFICACY BELIEFS AND PERCEPTIONS REGARDING THE IMPLEMENTATION OF NEW PRIMARY MATHEMATICS CURRICULUM**

İŞLER BAYKAL I., ÇAKIROĞLU E.

6th Congress of the European-Society-for-Research-in-Mathematics-Education (CERME), Lyon, France, 28 January - 01 February 2009, pp.1704-1713

Supported Projects

ÇAKIROĞLU E., DİDİŞ KABAR M. G., İŞLER BAYKAL I., KAPLAN CAN G., Project Supported by Higher Education Institutions, Matematik Öğretmen Adaylarının Liselere Giriş Sınavı LGS Matematik Testi Kapsamında Cebir Sorularına Yönelik Farkındalıklarının ve Cebir Soruları Geliştirme Becerilerinin İncelenmesi, 2021 - 2023

Çakiroğlu E., Akyüz D., İşiksal Bostan M., İşler Baykal I., Sevinç Ş., Slavíčková M., H2020 Project, Enhancement of research excellence in Mathematics Teacher Knowledge (MaTeK), 2021 - 2023

İŞLER BAYKAL I., ÖZTÜRK N., YILDIZEL İ., GÜZELLER G., Project Supported by Higher Education Institutions, Üçüncü, Dördüncü ve Beşinci Sınıf Öğrencilerinin Erken Cebir Alanında Hazır Bulunuşluklarının Belirlenmesi ve Erken Cebir Eğitiminin Etkisi, 2018 - 2021

Akkaş S. B., Eryılmaz A., Şentürk E., Koç İ., Demircan H. Ö., İşler Baykal I., H2020 Project, StART: Science through ART, 2019 - 2019

Scientific Refereeing

15th International Congress On Mathematical Education, Conference Paper (Abstract), September 2023

EUROPEAN JOURNAL OF SCIENCE AND MATHEMATICS EDUCATION, National Scientific Refreed Journal, July 2023

Batı Anadolu Eğitim Bilimleri Dergisi(BAEBD), National Scientific Refreed Journal, May 2023

Anadolu Journal of Educational Sciences International , National Scientific Refreed Journal, September 2022

EUROPEAN JOURNAL OF SCIENCE AND MATHEMATICS EDUCATION, Other Indexed Journal, December 2021

JOURNAL FOR RESEARCH IN MATHEMATICS EDUCATION, Journal Indexed in SSCI, June 2021

Participatory Educational Research, Other Indexed Journal, June 2021

Mehmet Akif Ersoy Üniversitesi Eğitim Fakültesi Dergisi, National Scientific Refreed Journal, April 2021

İNÖNÜ ÜNİVERSİTESİ EĞİTİM FAKÜLTESİ DERGİSİ, National Scientific Refreed Journal, June 2020

MATHEMATICAL THINKING AND LEARNING, Journal Indexed in SSCI, May 2020

IOJET, National Scientific Refreed Journal, March 2019

International Journal of Education in Mathematics, Science and Technology, Journal Indexed in ESCI, December 2018

Project Supported by Higher Education Institutions, BAP Research Project, Middle East Technical University, Turkey, December 2018

Metrics

Publication: 58

Citation (WoS): 253

Citation (Scopus): 145

H-Index (WoS): 7

H-Index (Scopus): 6

Non Academic Experience

University of Wisconsin-Madison