Sustainable Water Management Doctoral Programme (Water4All)

Title of the PhD Project	Integration of Sustainability and Circularity Assessment for Water Management in Circular Cities
Acronym	SCC
Research Fields of the Project	Environmental Engineering, Environmental Management, Water Resources Engineering, Environmental and Life Science
Keywords	Multi Criteria Decision Making, Wastewater Recovery, Environmental Management, Circular City, Sustainability
Host Institution, Department and Campus Location	Gebze Technical University, Gebze, Kocaeli, Turkiye
PhD Awarding Institution and Graduate Programme	Gebze Technical University, Gebze, Kocaeli, Turkiye PhD in Environmental Engineering
Name and Affiliation of Main Supervisor	Assist. Prof. Dr. Derya AYRAL ÇINAR
Name and Affiliation of Co-Supervisors	Assist. Prof. Dr. Emel TOPUZ
Research Environment and Infrastructure	GTU Environmental Engineering Department has several laboratories such as Instrumental Analysis, Microalgal Biotechnology, Air Pollution Laboratory, Drinking Water Laboratory, Soil Pollution and Solid Waste Sample Preparation Laboratory, Chemical Oxidation Laboratory, Electrotechnology Application Laboratory and Membrane Technologies Laboratory. https://www.gtu.edu.tr/kategori/368/0/display.aspx?languageId=2
Scientific Context of the Project	Due to the environmental concerns such as excess consumption of natural sources and the consequences of climate change, environmental management approach has been evolved from linearity to circularity. Circular city concept has been emerged in order to adapt circularity in environmental management at local scale. In the context of water management, circular cities are designed for wastewater recovery/reuse instead of discharging to natural sources. Sustainability concept also gained attention for the environmental protection and has been accepted as a common tool for the evaluation of manufacturing or service systems. Sustainability considers technological, economic, environmental and social feasibility from a holistic perspective while aiming environmental protection. Therefore, circularity and

	sustainability serves for the similar purpose at the fundamental level. There are many attempts to use either sustainability or circularity assessment for water management; however, these separate assessments are missing critical points. The aim of this project is to integrate circularity and sustainability assessment for water management in the circular cities to provide a holistic perspective and to simplify the assessment procedure for the water management. In this context, multi criteria decision tools will be used to determine sufficient criteria for the assessment and to quantify the sustainability and circularity with the usage of expert inferences. So, the proposed integration can support decision makers of the circular cities for water management.
Brief Workplan	Project will include the comprehensive literature search and the collaboration with local governmental authorities. At the first stage, circularity and sustainability in environmental management will be searched from literature and existing applications in the city management. Then, sufficient criteria for the sustainability and circularity assessment will be integrated and they will be structured in a hierarchy in the context of Analytical Hierarchy Process. Quantification procedure will be developed by integrating different types of multi criteria decision tools and fuzzy logic applications. Overall integrated approach will be proposed by using a standardized flow chart. Additionally, a case study will be applied for a pilot circular city design and results will be discussed considering the applicability and the benefits of the approach.
Innovative Aspects of the Project	Currently literature is still suggesting for the separate sustainability or circularity assessment for the water management in circular cities. However, there is a significant need to integrate these assessments since they serve for the similar purpose in the fundamental scale and they complement each other from many perspectives. Integration of these approaches will provide a holistic perspective for water management and a user-friendly decision-support tool for the decision makers.
Training Opportunities of the Project	Bilgi University, TR
Interdisciplinary Aspects	Management, Decision Making, Economy, Policy
Intersectoral Mobility ☒ **Short Visit**	Gebze Municapality, TR

☐ **Secondment**	
International Academic Secondment	TBD

Main Supervisor	
Brief CV	**Assist. Prof. Dr. Derya AYRAL ÇINAR** **E-mail:** deryacinar@gtu.edu.tr **Academic Degrees** Ph.D. Environmental Engineering, The University of Michigan, USA 2015 M.Sc. Environmental Engineering, The University of Michigan, USA 2010 B.Sc. Environmental Engineering, Istanbul Technical University, Türkiye 2007 **Professional Networks** Google Scholar: https://scholar.google.com/citations?user=RoyCcVMAAAAJ&hl=tr&oi=ao ResearchGate: https://www.researchgate.net/profile/Derya-Ayral-Cinar Scopus: https://www.scopus.com/authid/detail.uri?authorId=55218032700 ORCID: https://orcid.org/0000-0001-6378-6897
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Brief CV	**Assit. Prof. Dr. Emel TOPUZ** **E-mail:** emeltopuz@gtu.edu.tr **Academic Degrees**

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