

Programa de Doutorado Processo de Seleção para Ingresso em 2020

Devido às medidas contra a pandemia de Covid-19 as inscrições para o processo seletivo do curso de doutorado, para ingresso em agosto de 2020, foram prorrogadas até 15/06/2020.

As novas inscrições deverão ser feitas através do endereço ppgselecao.eesc.usp.br

Considerações Gerais

O curso de doutorado tem por objetivo formar docentes e pesquisadores com capacidade de atuação independente e de orientar, em curto prazo, alunos de iniciação científica e mestrado. Em médio prazo, os egressos do programa de doutorado devem ser capazes de orientar projetos de doutorado, seguindo carreira acadêmica ou atuando em setores que exijam o desenvolvimento de tecnologia inovadora.

Inscrição

As inscrições no processo seletivo ocorrerão de fluxo contínuo, porém as solicitações serão examinadas apenas duas vezes por ano. Para ingresso no primeiro semestre letivo de **2020 (março)**, os candidatos devem encaminhar suas inscrições até **31 de outubro de 2019**. Para ingresso no segundo semestre letivo de **2020 (agosto)**, os candidatos devem encaminhar suas inscrições até **30 de abril de 2020**.

Os candidatos não portadores do título de Mestre poderão se inscrever no processo seletivo para o Programa de Doutorado. No entanto, se o candidato for selecionado, a matrícula deverá ser efetuada no período letivo para o qual o candidato foi admitido. Em caso contrário, a admissão no Programa de Doutorado será cancelada.

Documentos necessários

- a.** *Curriculum vitae* do candidato (Plataforma Lattes - CNPq);
- b.** Súmula curricular do orientador com máximo de 3 páginas (modelo FAPESP);
- c.** Histórico escolar da pós-graduação;

- d.** Dissertação de Mestrado (se houver);
- e.** Certificado oficial de capacitação na língua inglesa **no Ato da Inscrição**, com a seguinte pontuação:
- TOEFL: 420 pontos
TOEFL ITP: 430 pontos
TOEFL IBT: 40 pontos
TOEIC: 400 pontos
IELTS: 4 pontos
CAMBRIDGE: 100 pontos
- f.** Apresentação de projeto de pesquisa em folha A4 (margem 2,5), espaço 1,5 entre linhas, letra Times New Roman - 12 pontos e máximo de 20 páginas. A primeira página deve conter apenas o título do trabalho, nome do candidato e nome do orientador. O projeto deverá ser entregue em 3 vias ;
- g.** Os seguintes aspectos fundamentais devem fazer parte do projeto de pesquisa:
- A contribuição para o conhecimento científico que a pesquisa proposta poderá trazer e,
 - Se essa contribuição é significativa e relevante para justificar a outorga de um título de doutor ou é apenas um trabalho longo, semelhante a um mestrado, porém com maior quantidade de informação.
- h.** Carta do candidato à Coordenação do Programa de Pós-Graduação manifestando interesse pelo curso;
- i.** Carta do futuro orientador à Coordenação do Programa de Pós-Graduação certificando estar de acordo com a inscrição do candidato, responsabilizando-se pelo trabalho de orientação e financiamento da pesquisa proposta;
- j.** Se houver necessidade de coorientação, a proposta deve vir acompanhada de carta do coorientador concordando com a proposta e de sua súmula curricular;
- k.** Duas (2) cartas de recomendação de docentes externos ao PPGSHS, conforme modelo apresentado nesse Edital. As cartas deverão ser encaminhadas diretamente para o PPGSHS.
- j.** Taxa de inscrição no valor de R\$ 100,00 (cem reais). Efetuar depósito a crédito de *USP/EESC/SHS - Taxas Pós-Graduação* no Banco do Brasil - Agência 3062-7 - Conta corrente nº 168.149-4 (anexar comprovante).

Enviar os documentos para Coordenação do Programa de Pós-Graduação em Engenharia Hidráulica e Saneamento, Escola de Engenharia de São Carlos - Universidade de São Paulo, Caixa Postal 359 - São Carlos - SP - CEP 13.560-970.

Se aprovado, o candidato deverá comprovar todas as informações apresentadas no currículo. A falta de qualquer documento implicará na desclassificação do candidato.

O aluno estrangeiro deverá solicitar equivalência do título de mestre junto à CPG da EESC-USP. A matrícula no Doutorado somente será possível a partir do reconhecimento do título de Mestre obtido no exterior.

Caso essa equivalência não seja aprovada, o candidato não poderá matricular-se, mas poderá se inscrever no processo seletivo de mestrado.

Não serão aceitas inscrições com documentação incompleta.

Doutorado Direto

O ingresso no Doutorado Direto, sem defesa de Mestrado, também será permitido. Nesse caso, o candidato deverá inscrever-se normalmente no **Processo Seletivo para o Mestrado** e cumprir todas as etapas desse processo, obtendo rendimento superior a 80% em cada uma das avaliações aplicadas. No formulário de inscrição deve ser indicado claramente que se trata de candidato ao Doutorado Direto. Ao mesmo tempo, aluno e orientador deverão enviar todos os demais documentos necessários para ingresso no Doutorado, apresentados neste Edital, para avaliação, respeitando as datas estipuladas pelo Programa.

Requisitos necessários para todos os candidatos a Doutorado Direto:

- Formação nas áreas de Engenharia; Ciências Biológicas e Química.
- Mínimo de um ano de Iniciação Científica ou outra atividade de pesquisa na área ou em área afim;

Doutorado Direto com Processo Seletivo GRE/FAPESP/USP

1. GRE/FAPESP/USP PPGSHS 2019 Full PhD Selection (“Doutorado Direto via GRE”)

Through the GRE/FAPESP/USP (DI Code: 2348), the PPG-SHS Graduate Programme also accepts applications for a Full PhD Selection (“Doutorado Direto GRE/USP”). Should the candidate will apply through GRE/USP-PhD Selection, s/he must also:

- (1) apply through the PPGSHS 2019 M Sc Selection Process (www.eesc.usp.br/ppgshs) , thereby declaring s/he is a Full PhD candidate through the GRE/USP option;
 - (2) fulfill all the 2019 PPGSHS M Sc Selection requisites, attending the official due examinations and timeplan;
 - (3) under the acceptance and guidance of her/his selected PPGSHS Supervisor (see GRE/FAPESP/USP PPGSHS List), append and submit a PhD Research Proposal (up to 25 pages, A4, 12 Times New Roman);
 - (4) append two Letters of Recommendation from external referees, and
 - (5) submit a Letter of Acceptance of her/his selected PPGSHS supervisor (see list below, eligible for the GRE/FAPESP/USP).
- At the same time, both candidate and his/her PPG-SHS supervisor must send all the documents for PhD Selection advertised in the 2019 Call, in the official deadlines announced in the PPGSHS 2019 Call.

2. GRE/FAPESP/USP PPGSHS 2020 PhD Selection Process Supervisor List (see Annex 1)

Edson Cezar Wendland
Edson Luiz Silva
Eduardo Mario Mendiondo
Luiz Antonio Daniel
Lyda Patricia Sabogal Paz
Maria Bernadete Varesche Amancio Silva

3. Requisites for PPGSHS 2020 Full PhD Candidates using the GRE/FAPESP/USP Call

- B Eng or Bach in engineering-related areas
- One (1) year minimum experience in research activities in engineering or related fields
- Two(2) Letters of Recommendation for external referees.

4. PPGSHS 2020 Full PhD Selection Method

The PPGSHS Selection Process will address four steps:

4.1 Step 1. Peer-review of Submitted Research Proposal : The candidate, under the acceptance and guidance of her/his selected PPGSHS Supervisor (see GRE/FAPESP/USP PPGSHS List), will elaborate and submit a Research Proposal. The review of this Research Proposal will be performed by two (2) ad-hoc reviewers selected by the PPGSHS 2019 PhD Commission, with a standardized form, with final scores ranging between 1(min.) to 5 (max.). PhD Research Proposals with scores ≤ 2 from at least one reviewer, or with scores ≤ 3 of the two reviewers will be rejected. The names of the peers will be anonymous.

4.2 Step 2. Evaluation of Curriculum Vitae and Bachelor grading scores

The CV of the candidate will be evaluated and graded by the PPGSHS 2020 PhD Selection according to the following criteria:

- Young Research experience (in undergraduate level): 0.25 points per year of experience
- Capacity/Training Course (up to 360 hours training): 1,0 points (if made in the same field of the PPGSHS) and 0.5 points in other field
- Master of Science: 3.0 points (if finished in a same field of PPGSHS) or 1.5 points (if finished in other fields, different from the PPGSHS)
- Full paper published in the proceedings of a national scientific meeting: 0.25 points per paper
- Full paper published in proceedings from an international meeting: 0.5 points per paper
- Full paper published in national, indexed journals: 0.75 points per paper
- Full paper published in an international, peer-review journal: 1.5 points per paper
- Book: 2.0 points per book as author; 1.0 points per book as co-author and 1.0 point per book as a book edited/coordinated/organized.
- Book chapter: 0.5 points per book chapter
- Patent of invention product or process : 1.5 points per invention
- Software developed and registered: 0.5 points per software registered
- Professional experience in the PPGSHS field: 0.25 points per year of experience (in the last 5 years)
- Former experience in research activities in the fields of PPGSHS: 0.25 points per year (in the last 5 years)
- Former experience of higher education lecturing: 0.25 points per year in the last 5 years.

The overall score will be from accumulated scores from the fore-mentioned topics, clearly declared in the candidate's CV, as well as from her/his PhD Research Proposal assessment from peer-review.

4.3 Step 3. Evaluation by the PPGSHS 2020 PhD Board

Additionally to the research evaluation from reviewers, the PPGSHS 2020 PhD Selection Board will evaluate, by a written Report, the relevance of the submitted PhD Research Proposal for the PPG-SHS Graduate Programme in Water Resources and Sanitary Engineering of the EESC-USP. Moreover, the experience and expertise of the selected PhD supervisor will be evaluated by the Board, clearly declared in her/his FAPESP Curriculum Summary. Main points for this expertise will be based in the previous experience of the selected PhD Supervisor in advising finished M Sc and PhD students as well as publication records in selected peer-review journals.

4.4. Step 4. Official Acceptance by the PPGSHS Coordination Board (CCP/PPGSHS)

The Report made by the PhD Commission Board on every PhD Candidate will be submitted to the PPGSHS Coordination Board (CCP/PPGSHS) which can accept or ask for a new review, under 2/3 majority voting from the CCP/PPGSHS members.

5. Results and Distribution of PhD Scholarships

The classification list, with accepted candidates for the PPGSHS 2020 PhD enrollment, will be announced until late December 2019. Candidates accepted for the 2020 PhD enrollment who

submitted through GRE/FAPESP/USP process will have the same merit basis extended by all other candidates accepted for the PPGSHS 2020 PhD Selection Process. In these cases, GRE/FAPESP/USP scholarship can be attributed through PrPG/USP (Vice-Rector of Graduate Programme), according to PrPG criteria ([link](#)). Moreover, according to the available funds and scholarships of the PPGSHS, PhD scholarships from CAPES and CNPq can also be addressed to the selected PhD candidate according to the final classification, both from the final score attributed to the candidate and from the ongoing distribution of previous scholarships to the selected PhD supervisor. To attend USP official enrollment, the 2020 PhD classification list will be valid for the 1st Lecture Semester (since February to July 2020).

Sistemática de Seleção

O processo seletivo constará de quatro etapas:

Etapa 1. Avaliação do Projeto de Pesquisa

O candidato deverá elaborar projeto de pesquisa de comum acordo com o futuro orientador. A avaliação será feita por dois assessores, um interno e um externo, em formulário padrão (<http://www.eesc.usp.br/ppgshs/informulários>). Nota, variando de 1 a 5 será atribuída ao projeto por cada assessor. Projetos que receberem nota 1 ou 2 de, pelo menos, um dos assessores serão eliminados do processo seletivo. Projetos que receberem nota 3 dos dois assessores também serão eliminados do processo seletivo. Os nomes dos assessores permanecerão em sigilo, não podendo ser divulgados pela Coordenação do Programa ou pelo próprio assessor sob qualquer circunstância.

Etapa 2. Avaliação do currículo e histórico escolar

O currículo será avaliado e pontuado pela Comissão de Seleção de acordo com os seguintes critérios:

- Iniciação científica na área: 0,25 pontos por ano
- Especialização (360 horas): 1,0 ponto na área ou correlata e 0,5 ponto em outra área
- Mestrado: 3,0 pontos na área ou correlata e 1,5 pontos em outra área
- Artigo completo em anais de congresso nacional: 0,25 pontos por artigo
- Artigo completo em anais de congresso internacional: 0,5 ponto por artigo
- Artigo completo em periódico nacional: 0,75 pontos por artigo
- Artigo completo em periódico internacional: 1,5 pontos por artigo
- Livro: 2,0 pontos por livro como autor; 1,0 ponto por livro como co-autor e 1,0 ponto por livro como coordenador, organizador ou editor
- Capítulo de livro: 0,5 ponto por capítulo
- Patente de produto ou processo: 1,5 pontos por patente
- Software desenvolvido e registrado: 0,5 ponto por produto
- Experiência profissional na área: 0,25 pontos por ano, nos últimos 5 anos

- Experiência em atividades de pesquisa na área: 0,25 pontos por ano nos últimos 5 anos
- Experiência em atividade docente em ensino superior: 0,25 pontos por ano nos últimos 5 anos

A nota será a soma das notas obtidas na análise de currículo e na avaliação do projeto de pesquisa.

Etapa 3. Avaliação pela comissão de seleção

De forma independente da avaliação pelos assessores, a Comissão de Seleção avaliará a importância e pertinência do projeto para o Programa de Pós-Graduação em Engenharia Hidráulica e Saneamento da Escola de Engenharia de São Carlos. A competência do docente para orientar o projeto será avaliada pela Comissão de Seleção a partir da Súmula Curricular, em parecer circunstanciado que justifique a sua capacidade. Essa justificativa será baseada principalmente nas orientações anteriores e nos trabalhos publicados pelo futuro orientador.

Etapa 4. Homologação pela Comissão Coordenadora do Programa

O relatório circunstanciado referente a cada candidato será encaminhado à Comissão Coordenadora do Programa de Pós-Graduação em Engenharia Hidráulica e Saneamento que poderá homologar o resultado ou solicitar revisão do pedido. As homologações serão individualizadas e o pedido de revisão somente será acatado quando for aprovado por dois terços dos membros presentes à reunião.

Resultados e Distribuição de Bolsas

As listas de classificados serão divulgadas no final de dezembro ou final de junho.

De acordo com a disponibilidade do programa, as bolsas de estudo CAPES e CNPq serão atribuídas obedecendo a lista de classificação final, resultante da composição da nota do aluno e da distribuição de bolsas entre os orientadores do programa.

Essa lista terá validade no período letivo para o qual o candidato foi admitido (de fevereiro a julho de 2020) ou (agosto a dezembro de 2020).

*Publicado em 09/10/2019.

SEGUE ABAIXO ANEXO GRE 1

Annex 1. Details of Supervisors Eligible for 2020 GRE/FAPESP/USP PPGSHS Full PhD Selection

DI Code (GRE): 2348

Graduate Programme: PPG-SHS

PhD Selection Process: www.eesc.usp.br/ppgshs

Supervisor: Edson C. Wendland

Principal Investigator of FAPESP Project (GRE/FAPESP eligible): Yes

FAPESP Project (CEPID/Thematic/Young Researcher): Thematic Project

FAPESP Project No: 2015/03806-1

FAPESP Contract Period: 01/04/2016 a 31/03/2021

FAPESP Project: Water availability and quality threats in a Guarani Aquifer System outcrop zone

PPGSHS/EESC-USP Research Field: Groundwater Hydrology & Water Resources

Summary of FAPESP Research Project: The Guarani Aquifer System (GAS) is one of the most important transboundary aquifers in the world. Located in parts of four South America countries (Argentina, Brazil, Paraguay and Uruguay), its area is estimated to 1.2 Million km². The GAS is formed by the eolian sandstones of the Jurassic (Botucatu formation) and fluvio-eolian Triassic (Pirambóia formation) periods. In Brazil 1,443 municipalities are located in the SAG area (BORGHETTI, 2004), with growing water demand for urban, industrial and agricultural purposes. Due to the strategic, social and economic importance of this aquifer for the four countries, it is necessary to understand its replenishment. The majority of recharge to the aquifer is hypothesized to occur in the outcrop areas, where the GAS appears as an unconfined aquifer. However few hydrogeologic studies focusing this question are available. The present project is compound of three major foci: 1. A monitoring network installed in the Ribeirão da Onça watershed aiming to understand and quantify the recharge mechanisms at these outcrop areas. A complete water balance can be evaluated, leading to the estimation of the main components of the hydrologic cycle (e.g., precipitation, evapotranspiration, storage, base flow) under agricultural use. The influence of different land uses (e.g. eucalyptus, sugar cane, citrus and grassland) can be quantified. 2. An experimental site under undisturbed dense Cerrado in order to understand pre-deforestation conditions. Canopy interception, throughfall, stemflow, surface runoff, erosion, and water table level are obtained, allowing the evaluation of the impact of soil use changes in comparison to native vegetation. 3. A monitoring network in an abandoned landfill aiming to the evaluation of contamination and transport processes in the Guarani Aquifer. Understanding the hydrological and contamination processes in detail scale is a key step in order to extrapolate local results to the whole aquifer system, providing reliable information for groundwater management and protection purposes.

Observation: This FAPESP project welcomes researchers from all countries, with different backgrounds and under equal opportunity and merit basis of diversity and inclusion, who will follow both the GRE-USP 2017 criteria and the EESC/USP PPGSHS Graduate Programme PhD 2017 Selection Process.

References: ANACHE, JAMIL A.A. ; WENDLAND, EDSON C. ; OLIVEIRA, PAULO T.S. ; FLANAGAN, DENNIS C. ; NEARING, MARK A. . Runoff and soil erosion plot-scale studies under natural rainfall: A meta-analysis of the Brazilian experience. Catena (Cremlingen), v. 152, p. 29-39, 2017. MELO, DAVI C.D. ; Wendland, Edson . Shallow aquifer response to climate change scenarios in a small catchment in the Guarani Aquifer outcrop zone. ANAIS DA ACADEMIA BRASILEIRA DE CIENCIAS, v. 89, p. 391-406, 2017. MACHADO, ALINE R. ; Wendland, Edson ; KRAUSE, PETER . Hydrologic Simulation for Water Balance Improvement in an Outcrop Area of the Guarani Aquifer System. Environmental Processes, v. 3, p. 1-20, 2016. OLIVEIRA, PAULO TARSO S. ; LEITE, MARCELO BOCCIA ; MATTOS, TIAGO ; NEARING, MARK A. ; SCOTT, RUSSELL L. ; DE OLIVEIRA XAVIER, RAFAEL ; DA SILVA MATOS, DALVA MARIA ; Wendland, Edson . Groundwater recharge decrease with increased vegetation density in the Brazilian cerrado. ECOHYDROLOGY, v. 9, p. 1, 2016. MELO, DAVI DE C. D. ; SCANLON, BRIDGET R. ; ZHANG, ZIZHAN ; Wendland, Edson ; YIN, LEI . Reservoir storage and

hydrologic responses to droughts in the Paraná River basin, south-eastern Brazil. *Hydrology and Earth System Sciences*, v. 20, p. 4673-4688, 2016. LUCAS, MURILO ; Wendland, Edson . Recharge estimates for various land uses in the Guarani Aquifer System outcrop area. *Hydrological Sciences Journal*, v. 60, p. 150320051027000, 2015. OLIVEIRA, PAULO TARSO S. ; NEARING, MARK A. ; MORAN, M. SUSAN ; GOODRICH, DAVID C. ; Wendland, Edson ; GUPTA, HOSHIN V. . Trends in water balance components across the Brazilian Cerrado. *Water Resources Research*, v. 50, p. n/a-n/a, 2014. Oliveira, P. T. S. ; WENDLAND, E. ; NEARING, M. A. ; SCOTT, R. L. ; ROSOLEM, R. ; DA ROCHA, H. R. . The water balance components of undisturbed tropical woodlands in the Brazilian Cerrado. *Hydrology and Earth System Sciences Discussions (Online)*, v. 11, p. 12987-13018, 2014. Oliveira, P. T. S. ; WENDLAND, E. ; NEARING, M. A. . Rainfall erosivity in Brazil: A review. *Catena (Cremlingen)*, v. 100, p. 139-147, 2013.

More information: <http://www.shs.eesc.usp.br/administracao/docente/?d=edson-cezar-wendland>

CV: <http://lattes.cnpq.br/3893936996168895>

DI Code (GRE): 2348

Graduate Programme: PPG-SHS

PhD Selection Process: www.eesc.usp.br/ppgshs

Supervisor: Edson Luiz Silva

Principal Investigator of FAPESP Project (GRE/FAPESP eligible): Yes

FAPESP Project (CEPID/Thematic/Young Researcher): Thematic Project

FAPESP Project No: 2015/06246-7

FAPESP Contract Period: since 01/07/2016 to 30/06/2021

FAPESP Project: Biorefinery Concept Applied to Biological Wastewater Treatment Plants: Environmental Pollution Control Coupled with Material and Energy Recovery

PPGSHS/EESC-USP Research Field: Wastewater Treatment

Summary of FAPESP Research Project: The main goal of this Research Project is to establish the fundamental bases to apply the biorefinery concept to a biological wastewater treatment plant, with generation of bioenergy and high value-added products. Such conception is based on the use of anaerobic reactors as the core technology in a wastewater treatment plant, mainly because this process generates a broad spectrum of organic acids and solvents in the liquid phase besides hydrogen and methane in the biogas. In this new approach, the wastewater treatment plant, with their reactors and unit operations, is a network of facilities to produce biofuels, power, and chemicals from organic wastewater. Several challenges must be overcome with this approach, including the low concentrations of organic matter in wastewater, leading to low concentration of intermediates and end products, and the complex composition of wastewater, with spatial and temporal variations. The use of mixed microbial cultures, though important and beneficial for anaerobic process, is another drawback for the biorefinery concept, since process control tends to be difficult. In this context, a multidisciplinary research group was formed to establish the scientific and technological fundamentals of a biorefinery fed with wastewater aiming at the generation of profitable products and energy besides complying with its main function of mitigating impacts from the release of wastewater into the environment.

Observation:

References: Ottaviano, L M; Ramos, L R; Botta, L S; Varesche, M B A; Silva, Edson Luiz . Continuous thermophilic hydrogen production from cheese whey powder solution in an anaerobic fluidized bed reactor: Effect of hydraulic retention time and initial substrate concentration. *International Journal of Hydrogen Energy*, v. 42, p. 4848-4860, 2017.

Ramos, L R; Silva, Edson Luiz . Continuous Hydrogen Production from Agricultural Wastewaters at Thermophilic and Hyperthermophilic Temperatures. *Applied Biochemistry and Biotechnology*, v. 2, p. 846-869, 2017.

Lazaro, C Z; Varesche, M B A; Silva, E.L. Effect of inoculum concentration, pH, light intensity and lighting regime on hydrogen production by phototrophic microbial consortium. *Renewable Energy*, v. 75, p. 1-7, 2015.

Lazaro, C Z; Varesche, M B A; Silva, Edson Luiz . Sequential fermentative and phototrophic system for hydrogen production: An approach for Brazilian alcohol distillery wastewater. *International Journal of Hydrogen Energy*, v. 40, p. 9642-9655, 2015;

Amorin, E L C; Sader, L T; Silva, E L. Effects of the Organic-Loading Rate on the Performance of an Anaerobic Fluidized-Bed Reactor Treating Synthetic Wastewater Containing Phenol. *Journal of Environmental Engineering (New York, N.Y.)*, v. 04015022, p. 04015022-1-04015022-9, 2015; Santos, S C; Ferreira R, P R; Sakamoto, I K; Varesche, M B A; Silva, Edson Luiz.

Continuous thermophilic hydrogen production and microbial community analysis from anaerobic digestion of diluted sugar cane stillage. *International Journal of Hydrogen Energy*, v. 39, p. 9000-9011, 2014; Santos, S C; Ferreira R, P R; Sakamoto, I K; Varesche, M B A; Silva, Edson Luiz.

Hydrogen production from diluted and raw sugarcane vinasse under thermophilic anaerobic conditions. *International Journal of Hydrogen Energy*, v. 39, p. 9599-9610, 2014.

More information: <http://www1.eesc.usp.br/ppgshs/orientador/37/edson-luiz-silva>

CV: <http://lattes.cnpq.br/9720274214573371>

DI Code (GRE): 2348

Graduate Programme: PPG-SHS

PhD Selection Process: www.eesc.usp.br/ppgshs

Supervisor: Eduardo Mario Mendiondo

Principal Investigator of FAPESP Project (GRE/FAPESP eligible): Yes

FAPESP Project (CEPID/Thematic/Young Researcher): Thematic Project

FAPESP Project No: 2014/50848-9

FAPESP Contract Period: since 01/07/2017 to 30/06/2023

FAPESP Project: National Institute of Science & Technology on Climate Change-II (INCT Mudanças Climáticas-MC-II)

PPGSHS/EESC-USP Research Field: Hydrology & Water Resources Security

Summary of FAPESP Research Project: To attend UN International Decade for Action “Water for Sustainable Development” 2018-2028, this FAPESP Thematic project will address Water Security as an interdisciplinary concept which assesses levels of water risks tolerable for a society under change. Linking key global agendas of: the Sendai Framework for Disaster Risk Reduction 2015-2030 (DRR), the Sustainable Development Goals (SDGs) and the Paris Agreement on Climate Change (COP’21), this FAPESP project will couple IPCC/AR5 scenarios under non-stationarity drivers of urbanization growth, land-use change and biodiversity losses with practical actions of merging DRR and SDGs across the Brazilian territory (see Rossato et al, 2017). This FAPESP multi-institutional project looks for novel scientific knowledge to handle water security’s uncertainties (Rodrigues et al, 2015) proactively to: (i) assess safety indicators of water sectors under non-stationary drivers of climate and land use change, (ii) present securitization options for decision-making at river basins, and (iii) establish water strategies at multi-governance levels. Also, this FAPESP thematic project aims to analyse traditional and new water security criteria in critical river basins in Brazil and South America, through adaptation strategies towards resilience and sustainability of water user sectors. The methodology encompasses: (1) Selection of strategic river basins’ water security database under change, (2) Calibration/validation of human-water processes under non-stationarity, (3) Simulation of future reference and intervention scenarios merging IPCC/AR5/COP’21, DRR and SDG frameworks at river basin scales, (4) Evaluation of new adaptation strategies of risk transfer models of insurance (Mohor & Mendiondo, 2017), ecosystem-based adaptation (EbA, see i.e. Taffarello et al, 2017) and offsetting water footprint (WF, i.e. Rodrigues et al, 2014), and (5) Proposition of framework for improving water security communication of insurance, EbA and WF tools with river basin’s stakeholders.

Observation: This FAPESP project welcomes researchers from all countries, with different backgrounds and under equal opportunity and merit basis of diversity and inclusion, who will follow both the GRE-USP 2017 criteria and the EESC/USP PPGSHS Graduate Programme PhD 2017 Selection Process.

References: Mohor, G. S., Mendiondo, E M (2017) Economic indicators of Hydrologic Drought Insurance Under Water Demand & Climate Change Scenarios in a Brazilian Context, Ecological Economics, DOI: 10.1016/j.ecolecon.2017.04.014; Rossato, L., Marengo, J., Mendiondo, E. M + author (2017) Impact of soil moisture over Palmer Drought Severity Index and its future projections in Brazil, Braz. J. Wat. Res. DOI: 10.1590/2318-0331.0117160045; Taffarello, D., Mohor, G., Guimaraes, J., Calijuri, M. C., Mendiondo, E M (2017) Modelling freshwater quality scenarios with ecosystem- based adaptation in the headwaters of the Cantareira system, Brazil, HESSD-Hydrol. Earth Syst. Sci. Discuss., DOI: 10.5194/hess-2017-474; Rodrigues, D, Gupta, H, Mendiondo, E M, Oliveira, P T (2015) Assessing uncertainties in surface water security: An empirical multimodel, Water Res. Research, DOI: 10.1002/2014WR016691; Rodrigues, D, Gupta, H, Mendiondo, E M (2014) A blue/green water-based accounting framework for assessment of water security, Water Res. Research, doi: 10.1002/2013WR014274

More information: <http://www1.eesc.usp.br/ppgshs/orientador/6/eduardo-mario-mendiondo>

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DI Code (GRE): 2348

Graduate Programme: PPG-SHS

PhD Selection Process: www.eesc.usp.br/ppgshs

Supervisor: Lyda Patricia Sabogal Paz

Principal Investigator of FAPESP Project (GRE/FAPESP eligible): No

FAPESP Project (CEPID/Thematic/Young Researcher): Thematic Project

FAPESP Project No: 2012/50522-0

FAPESP Contract Period: since 01/01/2013 to 31/12/2017

FAPESP Project: Environmental contamination by protozoa Giardia spp. and Cryptosporidium spp. and Ascaris suum: challenges of detection, removal and inactivation of infective forms.

PPGSHS/EESC-USP Research Field: Environmental Engineering

Summary of FAPESP Research Project: The transmission of waterborne diseases related to water supply for human consumption has been recorded even in developed countries. The authorities' attention has focused on actions related to detection and control of protozoa Cryptosporidium spp. and Giardia spp. since several outbreaks caused by these microorganisms have been reported in recent decades. The main source of water contamination by these pathogens is the disposal of domestic sewage (treated or not) into water that is commonly used as source of supply. In Brazil, the services of collecting, transporting and treating sewage are still poor. The fact has spawned the emergence of several waterborne outbreaks for protozoa in the country. Despite of the advances in the Brazilian research in relation to the detection and treatment of pathogens in the water, there are still many uncertainties related to the efficiency of disinfection, disposal of generated sludge in water treatment and sewage systems, and knowledge of particular species in Brazil and its potential sources of infection. Due to the existing problem, this project aims to assess the environmental contamination generated by the protozoa Giardia spp. and Cryptosporidium spp. and eggs of Ascaris suum, considering the challenges of detection, removal and inactivation of infectious forms. The successful development of this project will suggest methodological basis: i) to evaluate the occurrence of Giardia cysts and Ascaris suum eggs in the soil, ii) to study the removal of protozoa in drinking water and the disposal alternatives of generated sludge after treatment, iii) to evaluate the removal of protozoa in sewage treatment and effluent disposal in surface water, and iv) to guide the best method to assess infectivity caused by protozoa. (AU)

Observation:

References: MACIEL, P. M. F.; SABOGAL-PAZ, L. P. Removal of Giardia spp. and Cryptosporidium spp. from water supply with high turbidity: analytical challenges and perspectives. JOURNAL OF WATER AND HEALTH, v. 14, n. 3, p. 369-378, JUN 2016.

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<http://lattes.cnpq.br/5922933119556718>

DI Code (GRE): 2348

Graduate Programme: PPG-SHS

PhD Selection Process: www.eesc.usp.br/ppgshs

Supervisor: Maria Bernadete Amancio Varesche Silva

Principal Investigator of FAPESP Project (GRE/FAPESP eligible): Yes

FAPESP Project (CEPID/Thematic/Young Researcher): Thematic Project

FAPESP Project No: 2015/06246-7

FAPESP Contract Period: since 01/07/2016 to 30/06/2021

FAPESP Project: Biorefinery Concept Applied to Biological Wastewater Treatment Plants: Environmental Pollution Control Coupled with Material and Energy Recovery

PPGSHS/EESC-USP Research Field: Wastewater Treatment

Summary of FAPESP Research Project: The main goal of this Research Project is to establish the fundamental bases to apply the biorefinery concept to a biological wastewater treatment plant, with generation of bioenergy and high value-added products. Such conception is based on the use of anaerobic reactors as the core technology in a wastewater treatment plant, mainly because this process generates a broad spectrum of organic acids and solvents in the liquid phase besides hydrogen and methane in the biogas. In this new approach, the wastewater treatment plant, with their reactors and unit operations, is a network of facilities to produce biofuels, power, and chemicals from organic wastewater. Several challenges must be overcome with this approach, including the low concentrations of organic matter in wastewater, leading to low concentration of intermediates and end products, and the complex composition of wastewater, with spatial and temporal variations. The use of mixed microbial cultures, though important and beneficial for anaerobic process, is another drawback for the biorefinery concept, since process control tends to be difficult. In this context, a multidisciplinary research group was formed to establish the scientific and technological fundamentals of a biorefinery fed with wastewater aiming at the generation of profitable products and energy besides complying with its main function of mitigating impacts from the release of wastewater into the environment.

Observation:

References: Andrade, M V F; Sakamoto, I K; Corbi, J J; Silva, E L; Varesche, M B A. Effects of hydraulic retention time, co-substrate and nitrogen source on laundry wastewater anionic surfactant degradation in fluidized bed reactors. *Bioresource Technology*, v. 224, p. 246-254, 2017.

Delforno, T P; Lacerda Júnior, G V; Noronha, M F; Sakamoto, I K; Varesche, M B A; Oliveira, V M. Microbial diversity of a full-scale UASB reactor applied to poultry slaughterhouse wastewater treatment: integration of 16S rRNA gene amplicon and shotgun metagenomic sequencing. *MicrobiologyOpen*, v. 1, p. e00443-12, 2017.

Delforno, T.P. ; LACERDA, G.V. ; SIERRA-GARCIA, I.N. ; Okada, D.Y. ; MACEDO, T.Z. ; Varesche, M.B.A. ; Oliveira, V.M. . Metagenomic analysis of the microbiome in three different bioreactor configurations applied to commercial laundry wastewater treatment. *Science of the Total Environment*, v. 587-, p. 389-398, 2017.

Soares, L A; Braga, J K; Motteran, F; Sakamoto, I K; Silva, E L; **Varesche, M B A**. Design and optimization of hydrogen production from hydrothermally pretreated sugarcane bagasse using response surface methodology. *Water Science and Technology*, v. 76, p. wst2017183-105, 2017.

Macedo, T Z; Delforno, T P; Braga, J K; Okada, D Y; Silva, E L; Varesche, M B A. Robustness and Microbial Diversity of a Fluidized Bed Reactor Employed for the Removal and Degradation of an Anionic Surfactant from Laundry Wastewater. *JOURNAL OF ENVIRONMENTAL ENGINEERING*, v. 143, p. 04017062-13, 2017.

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CV: <http://lattes.cnpq.br/2291054769194665>

DI Code (GRE): 2348

Graduate Programme: PPG-SHS

PhD Selection Process: www.eesc.usp.br/ppgshs

Supervisor: Luiz Antonio Daniel

Principal Investigator of FAPESP Project (GRE/FAPESP eligible): Yes

FAPESP Project (CEPID/Thematic/Young Researcher): Thematic Project

FAPESP Project No: 2012/50522-0

FAPESP Contract Period (dd/mm/yyyy): since 01/01/2013 to 31/12/2017

FAPESP Project: *Environmental contamination by Giardia spp. and Cryptosporidium spp. and by Ascaris suum: challenges of detection, removal and inactivation of infective forms.*

PPGSHS/EESC-USP Research Field: Sanitary engineering

Summary of FAPESP Research Project: The transmission of waterborne diseases related to water supply for human consumption has been recorded even in developed countries. The authorities' attention has focused on actions related to detection and control of protozoa *Cryptosporidium* spp. and *Giardia* spp. since several outbreaks caused by these microorganisms have been reported in recent decades. The main source of water contamination by these pathogens is the disposal of domestic sewage (treated or not) into water that is commonly used as source of supply. In Brazil, the services of collecting, transporting and treating sewage are still poor. The fact has spawned the emergency of several waterborne outbreaks of protozoa in the country. Despite of the advances in the Brazilian research in relation to the detection and treatment of the pathogens in the water, there are still many uncertainties related to the efficiency of disinfection, disposal of generated sludge in water treatment and sewage treatment, and knowledge of particular species in Brazil and its potential sources of infection. Due to the existing problem, this project aims to assess the environmental contamination generated by the protozoa *Giardia* spp. and *Cryptosporidium* spp. and eggs of *Ascaris suum*, considering the challenges of detection, removal and inactivation of infectious forms. The successful development of this project will suggest methodological basis: i) to evaluate the occurrence of *Giardia* cysts and *Ascaris suum* eggs in the soil; ii) to study the removal of protozoa in drinking water and the disposal alternatives of generated sludge after treatment; iii) to evaluate the removal of protozoa in sewage treatment and effluent disposal in surface water. And iv) to guide the best method to assess infectivity caused by protozoa.

Observation: This FAPESP project welcomes researchers from two Brazilian Institutions – Unicamp and USP, with different backgrounds and under equal opportunity and merit basis of diversity and inclusion, who will follow both the GRE-USP 2017 criteria and the EESC/USP PPGSHS Graduate Programme PhD 2017 Selection Process.

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MEDEIROS, R. C. ; DANIEL, L. A. . Cloração de esgoto sanitário: variação de cloro residual e o uso de parâmetros facilmente mensuráveis na indicação de breakpoint. *REVISTA DAE*, v. 65, p. 87-98, 2017.

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SIQUEIRA-CASTRO, ISABEL CRISTINA VIDAL ; GREINERT-GOULART, JULIANE ARAÚJO ; BONATTI, TAIS RONDELLO ; YAMASHIRO, SANDRA ; Franco, Regina Maura Bueno . First report of predation of *Giardia* sp. cysts by ciliated protozoa and confirmation of predation of *Cryptosporidium* spp. oocysts by ciliate species. *Environmental Science and Pollution Research International (Internet)*, v. 23, p. 11357-11362, 2016.

SIQUEIRA-CASTRO, ISABEL CRISTINA VIDAL ; GREINERT-GOULART, JULIANE ARAÚJO ; ROSSETTO, RENATO ; GUIMARÃES, JOSÉ ROBERTO ; Franco, Regina Maura Bueno . Ciliated protozoa community of a combined UASB-activated sludge system in southeastern Brazil. *Environmental Science and Pollution Research International*, v. 23, p. 01-11, 2016.

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