

24<sup>th</sup> International Conference on Subterranean Biology

20 – 24 August 2018 University of Aveiro, Portugal

### Organized under the Auspices of the International Society for Subterranean Biology



Information, Program & Schedule



### 24<sup>th</sup> International Conference on Subterranean Biology

20 – 24 August 2018 University of Aveiro, Portugal

### Organized under the Auspices of the International Society for Subterranean Biology

#### **Scientific Committee:**

David Culver (USA) (President) Ana Sofia Reboleira (Portugal) Annette Summers Engel (USA) Daniel Fong (USA) Fernando Goncalves (Portugal) Florian Malard (France) Henrik Enghoff (Denmark) Ignacio Ribera (Spain) Lubomir Kováč (Slovakia) Markus Friedrich (USA) Megan L. Porter (USA) Stefano Taiti (Italy) Oana Moldovan (Romania) Peter Trontelj (Slovenia) Steven Cooper (Australia) Steve Taylor (USA) Tanja Pipan (Slovenia) Tiziana Di Lorenzo (Italy) William Humphreys (Australia) William Jeffery (USA)

#### **Organizing Committee:**

Chair: Ana Sofia P. S. Reboleira Natural History Museum of Denmark, University of Copenhagen

> Co-chair: Fernando Gonçalves University of Aveiro

Committee Members: Alberto Sendra, University of Alcalá, Spain; Paulo Borges, University of Azores; Pedro Oromí, University of La Laguna, Spain; Rosalina Gabriel, University of Azores.

#### Secretariat:

Head: Joana Pereira, University of Aveiro André Gouveia, University of Aveiro Andrea Castaño Sánchez, University of Copenhagen Bernardo Barosa, University of Aveiro Fábio Campos, University of Aveiro Fátima Jesus, University of Aveiro Inês Macário, University of Aveiro Joana Santos, University of Aveiro Libânia Queirós, University of Aveiro Sara Ribeiro, University of Aveiro Tânia Vidal, University of Aveiro Telma Veloso, University of Aveiro

#### **Conference Logo Design:**

Arn Rytter Jensen, University of Copenhagen

#### **Pre-conference workshops**

(http://24icsb.web.ua.pt/index.php/workshops)

### Saturday 18/08/2018

10:00-13:00 Workshop 1: Trait-based analyses in groundwater ecology and bioassessment

Place: Reitoria main Building - Senado room

14:00-17:00 Workshop 1 (continuation): Trait-based analyses in groundwater ecology and bioassessment

Place: Reitoria main Building - Senado room

14:00-17:00 Workshop 2: Governance of subterranean ecosystems – legal approaches & instruments

Place: Reitoria main Building - Traduções room

### Sunday 19/08/2018

10:00-13:00 Workshop 1 (continuation): Trait-based analyses in groundwater ecology and bioassessment

Place: Reitoria main Building - Senado room

10:00-13:00 Workshop 3: Genomics of cave invertebrates Place: Reitoria main Building - Traduções room

10:00-13:00 Workshop 4: Riverbed colmation, its effects on stream ecology and restauration and the legal background Place: Biology Building – 8.1.18 room

14:00-17:00 Workshop 5: Guidelines on Laboratory Practices with subterranean fauna

Place: Reitoria main Building - Senado room

### 24<sup>th</sup> International Conference on Subterranean Biology

### Program

### Sunday 19/08/2018

## 15:30-19:30 Dorm Room Check In – at the Hall of Reitoria Main Building (for those registered with accommodation)

<u>University of Aveiro</u> Address: Campus Universitário de Santiago 3810-193 Aveiro Phone: +351 234 370 361 GPS Coordinates 40° 37' 53" N 8° 39' 27" W

How to arrive: http://24icsb.web.ua.pt/index.php/venue

University of Aveiro campus map: http://postip.web.ua.pt/docs/mapa\_ua.pdf

15:30-19:30 Informal Pre-Conference Gathering & Conference Check-in and registration
 Place: Reitoria Main Building
 20:00-22:00 Welcome Drink & Dinner

Place: Casa de São Sebastião (Rua São Sebastião, 42)

## Monday 20/08/2018

Place: Reitoria Main Building

08:30-10:00	Registration at the Reitoria hall
10:00-10:30	Opening Ceremony Opening presentation Ana Sofia Reboleira, University of Copenhagen <b>Subterranean Biology in the Anthropocene</b>
10:30-11:00	Coffee break

#### **Oral Presentations**

Only the presenting author is listed in the program. All coauthors and affiliations are listed with each abstract.

Abstracts are available on the USB drive in your registration package and will be online after the conference.

The asterisk identifies students competing for the best oral presentation award.

#### 11:00–12:30 Session 1: Moderators: Rosalina Gabriel & Stefano Taiti

Plenary talk 11:00–11:30 Christian Griebler, Helmholtz Zentrum München Carbon cycling and food web dynamics in groundwater ecosystems – key drivers and major limitations

11:30–11:45 Tiziana Di Lorenzo, National Research Council of Italy Predictive ecological risk assessment of pesticide mixtures in Mediterranean porous aquifers

11:45–12:00 \* Tobias Siemensmeyer, University of Koblenz Landau GroundCare – Invertebrates as indicators for untreated water and intrusion of surface water in water supply systems

12:00–12:15 Susanne van den Berg-Stein, Koblenz-Landau University StygoTracing – preliminary experiments with biological tracers in drinking water extraction areas

12:15–12:30 Daniel Fong, American University, Washington D.C. Wound melanization response is conserved among albino subterranean arthropods but has been lost in the cave shrimp *Troglocaris anophthalmus* 

#### 14:00–15:30 Session 2: Moderators: Maja Zagmajster & Arnaud Faille

Plenary talk14:00–14:30William Jeffery, University of MarylandMaternal Genetic Effects in Astyanax Cavefish Development

14:30–14:45 \* Barbara Langille, University of Adelaide Molecular evolution of 'eye genes' in blind diving beetles from the calcrete archipelago of Western Australia: evidence for neutral evolution of phototransduction genes

14:45–15:00 Henrik Enghoff, University of Copenhagen **Subterranean millipedes, patterns and adaptations** 

15:00–15:15 \* Špela Borko, University of Ljubljana Testing for adaptive radiation in subterranean amphipods

15:15–15:30 \* John G. Phillips, University of Tulsa Genetic diversity of an enigmatic aquifer species from the southeastern United States, the Georgia Blind Salamander (*Eurycea wallacei*)

15:30–16:00 Coffee break

#### 16:00–17:00 Session 3: Moderators: Tiziana Di Lorenzo & Steve Cooper

16:00–16:15 Kym Abrams, University of Western Australia A remarkable radiation: taxonomy and systematics of Australian short-tailed whipscorpions (Schizomida) in the Pilbara bioregion

16:15–16:30 \* Mattia Sacco, Curtin University Elucidating the food web structure of the subterranean invertebrate communities of arid zone Western Australia

16:30–16:45 Louis Deharveng, Museum national d'Histoire naturelle Ongoing invertebrate extinctions in a Vietnamese/Cambodian karst biodiversity hotspot

16:45–17:00 Maja Zagmajster, University of Ljubjana Contribution of range restricted and widespread species to biodiversity patterns in the Western Balkans in Southern Europe

17:00–17:15 William Farmer, American University, Washington D.C.

Long-term multiple-mark multiple-recapture estimates of the population size of *Stygobromus tenuis potomacus* from a hypotelminorheic habitat

17:15 Meeting of the Council of the International Society for Subterranean Biology

18:15 "Traditional Sweet Eggs" hands on workshop (sponsored, regional product)

### Tuesday 21/08/2018

Place: Reitoria Main Building

#### 9:00–10:30 Session 4: Moderators: Jill Yager & Paulo Borges

Plenary talk9:00–9:30Cene Fišer, University of LjubjanaBeyond invertebrate troglomorphy: what is the function of the trait?

9:30–9:45 \* Aron Katz, University of Illinois Comparative phylogeography of two cavernicolous springtails (Collembola) codistributed across a geologically complex karst landscape

9:45–10:00 \* Heather Gilbert, American University Amphipod Behavioral Adaptations to the Absence of Surface Water

10:00–10:15 Iva Njunjić, Sorbonne Universités Comprehensive evolutionary analysis of the Anthroherpon radiation (Coleoptera, Leiodidae, Leptodirini)

10:15–10:30 Kathleen Lavoie, State University of New York College Seasonal individual size distributions and sex ratios of entrance populations and winter deep cave populations of cave crickets, *Hadenoecus subterraneus*, from caves in central Kentucky, United States of America

10:30–11:00 Coffee break

11:00–12:30 Session 5: Moderators: Ana Komerički & Cene Fišer

Plenary talk 11:00–11:30 Jill Yager, Smithsonian Institution **The remarkable remipedes** 

11:30–11:45 \* Charles Stephen, Auburn University Unravelling the eastern North American *Hesperochernes* (Pseudoscorpiones, Chernetidae) species complex

11:45–12:00 Yahui Zhao, Chinese Academy of Sciences **Beauty underground: cavefishes in China** 

12:00–12:15Andrew Gluesenkamp, San Antonio Zoo**The Mexican Blindcat Project: new discoveries and future efforts** 

12:15–12:30 Rosalina Gabriel, University of Azores Conservation concern' bryophytes find refuge on cave entrances in the Azores

#### 12:30–14:00 Lunch

#### 14:00–15:30 Session 6: Moderators: Ana Sofia Reboleira & Michael Slay

Plenary talk

14:00–14:30 Florian Malard, Université Lyon-CNRS Integrating multiple species criteria and species hypotheses in subterranean biology

14:30–14:45 Slavko Polak, Notranjska Museum Postojna Phylogenetic position, distribution and morphology of *Adelopsella bosnica* Jeannel, 1908 (Coleoptera: Leiodidae: Cholevinae: Leptodirini) unravel the origin of Old World leptodirines

14:45–15:00 \* Ceth Parker, University of Akron Brazilian Iron Formation Caves Reveal a Novel Mechanism of Microbially Driven Cave Formation

15:00–15:15 Danté B. Fenolio, San Antonio Zoo **The subterranean biodiversity of Delaware County, Oklahoma, USA** 

15:15–15:30Michal Rendoš, University of Prešov**Dynamics of collembolan communities inside the forested scree slope** 

#### 15:30–16:00 Coffee break

16:00–17:15 Session 7: Moderators: Špela Gorički & Henrik Enghoff

16:00–16:15 Maja Zagmajster, University of Ljubljana Evaluating different conservation approaches to protection of subterranean fauna in Slovenia

16:15–16:30 \* Jenna Keany, American University Subterranean Species in Washington, D.C.: Spatial Analysis, Habitat Preferences, & Urban Conservation Implications

16:30–16:45 \* Giulia Perina, Edith Cowan University Research and stakeholders: Bathynellidae (Bathynellacea, Crustacea) case studies in mining areas. New genera from Australia and the enigma of the "cosmopolitan" *Bathynella* genus

16:45–17:00 Ana Komerički, Fauna & Flora International Conservation efforts for cave invertebrates and their habitats in Southeast Asia

17:00–17:15 Paulo Borges, University of Azores Red List of Azorean endemic cave adapted arthropods: an ecological and conservation overview

17:30 Meeting of the IUCN SSC Cave Invertebrate Specialist Group

18:30 Optical equipment demonstration (sponsored)

### Wednesday 22/08/2018

Place: Fieldtrip to the major karst massif of Portugal (Estremenho karst massif)

- 7:30 Departure in front of the Reitoria Building
- 10:00–12:30 Cave visit
- 12:30-14:00 Lunch
- 14:00–16:30 Karst tour
- 18:00 Return to the University of Aveiro

#### Place: Reitoria Main Building

#### 9:00–10:30 Session 8: Moderators: Giulia Perina & Lubomir Kovac

Plenary talk9:00-9:30Steven Cooper, South Australian MuseumSpeciation underground in desert aquifers or just another case of<br/>hybridisation by blind beetles?

9:30–9:45 Alejandro Martínez, National Research Council of Italy Global correlates of diversity in aquatic subterranean fauna

9:45–10:00 Marconi Souza-Silva, Federal University of Lavras Cave physical attributes influencing the structure of terrestrial invertebrate communities in Atlantic rainforest

10:00–10:15 Rodrigo Lopes Ferreira, Federal University of Lavras Subterranean biodiversity in a semi-arid tropical limestone outcrop: the role of cave microhabitats and aboveground landscape features in structuring invertebrate communities

10:15–10:30 Maria Elina Bichuette, Federal University of São Carlos Characterization and perspectives on studies of subterranean invertebrates communities in Latin America

#### 10:30–11:00 Coffee break

#### 11:00–12:30 Session 9: Moderators: Iva Njunjić & Daniel Fong

Plenary talk 11:00–11:30 Grant Hose, Macquarie University What happens to groundwater ecosystems when you take out the groundwater?

11:30–11:45 Oana Moldovan, "Emil Racovita" Institute of Speleology Can the subterranean fauna be used as proxy for past environmental changes? – the example of the Carpathians cave fauna

11:45–12:00Kathryn Korbel, Macquarie UniversityBiotic distribution within groundwater- is it really unpredictable?

12:00–12:15 \* Andreas Marco Hofer, University of Koblenz-Landau Sampling invertebrates in drinking water supply systems

#### 12:30–14:00 Lunch

#### 14:00–16:00 Session 10: Moderators: Jenna Keany & Peter Trontelj

Plenary talk

14:00–14:30 Ľubomír Kováč, Pavol Jozef Šafárik University Phylogeny of the genus *Pseudosinella* (Hexapoda, Collembola) from the Western Carpathians caves reveals Miocene diversification

14:30–14:45Stuart Halse, Bennelongia Environmental ConsultantsWhat does sampling tell us about the ecology of troglofauna?

14:45–15:00 Kazimir Miculinić, Croatian Biospeleological Society Establishing the monitoring of cave invertebrate fauna and habitats in Croatia

15:00–15:15 Paragamian Kaloust, Hellenic Institute Speleological Research **Diversity and conservation of the cave fauna of Crete (Greece)** 

15:15–15:30 Alberto Sendra, University of Alcalá Troglobitic Diplura

15:30–15:45 Raoul Manenti, University of Milan Preliminary conservation status assessment of cave-dwelling planarians (Platyhelminthes, Tricladida) of Italian Alps and Apennines

15:45–16:00\* Gerhard Du Preez, North-West UniversityNematodes down under: State of knowledge and future trends

#### 16:00–16:30 Coffee break and group photo

16:30–18:00 Poster Session

#### **Poster Session**

Only the presenting author is listed in the program. All coauthors and affiliations are listed with each abstract.

Abstracts are available on the USB drive in your registration package and will be online after the conference.

The asterisk identifies students competing for the best poster presentation award. The posters should be delivered in the secretariat on  $20^{\text{th}}$  of August from 8:30 to 10:00, during the registration at the Reitoria Main Auditorium.

1

## Environmental DNA in subterranean biology update: from "Where?" to "How many?"

Špela Gorički, Scriptorium biologorum, Murska Sobota, Slovenia

#### 2

#### Hyperparasitism in caves: bats, bat flies and ectoparasitic fungus

Ana Sofia Reboleira, University of Copenhagen, Denmark

#### 3

## Light entrains circadian activity rhythm in the microphthalmic cave beetle *Ptomaphagus hirtus*

Markus Friedrich, Wayne State University, USA

#### 4

#### Exploring the morphospace of subterranean spiders

\* Stefano Mammola, University of Torino, Italy

#### 5

## Cave and karst fauna conservation in Lower Kinabatangan, Sabah, Malaysian Borneo

Iva Njunjić, Muséum national d'Histoire naturelle, Sorbonne Universités, France

#### 6

#### Stygobiontic species in genus *Haber* (Clitellata, Naididae, Tubificinae)

Elzbieta Dumnicka, Institute of Nature Conservation, Polish Academy of Sciences

#### 7

### 1<sup>st</sup> Croatian Biospeleological expedition – Biokovo 2017

Martina Pavlek, Croatian Biospeleological Society, Croatia

#### 8

## Comparative acute toxicity of the pharmaceutical compound Diclofenac on groundwater and surface water crustaceans

\* Andrea Castaño Sánchez, University of Copenhagen, Denmark

#### 9

# The use of groundwater crustacean communities as indicators for aquifers quality in the semi-arid region of north-central Chile

Tiziana Di Lorenzo, Nacional Research Council of Italy

#### 10

Survival, metabolic rates and locomotory activities of a groundwater-obligate copepod species under long-term exposures to tetrachloroethylene

Tiziana Di Lorenzo, Nacional Research Council of Italy

#### 11

The juliform millipedes of Caucasian caves: Archileucogeorgia/Leucogeorgia (Diplopoda: Julida: Julidae) – a forgotten group of diplopods

Hans S. Reip, Senckenberg Museum of Natural History, Germany

#### 12

What's in there and what can it tell us – Exploring the Nucleotide database for cave microbial entries

\* Bernardo Barosa, University of Aveiro, Portugal

#### 13

**Caves as a source of new antimicrobial agents: The case study of antibacterial activity from microorganisms inhabiting Cerâmica cave, Portugal** \* André Gouveia, University of Aveiro, Portugal

14

#### Accessing bioactive potential of cave bacterial extracts

\* Telma Veloso, University of Aveiro, Portugal

#### 15

#### The IUCN-SSC Cave Invertebrate Specialist Group

Louis Deharveng, Museum national d'Histoire naturelle, France

#### 16

## The paleoenvironmental reconstruction using fossil invertebrates of Zăton Lake (south-western Romania)

Oana Moldovan, "Emil Racovita" Institute of Speleology, Romania

#### 17

## Comparison of thermal tolerance in Collembola (Hexapoda) inhabiting soil and subterranean habitats

Ľubomír Kováč, Pavol Jozef Šafárik University, Slovakia

#### 18

#### Preliminary study of cave habitat restoration for the conservation of the microendemic planarian species *Dendrocoelum italicum*

\* Benedetta Barzaghi, Università degli Studi di Milano, Italy

#### 19

## Distribution of cultivable filamentous fungi isolated from show caves in the Iron Quadrangle (Minas Gerais, Brazil)

Rodrigo Lopes Ferreira, Federal University of Lavras, Brazil

#### 20

#### Distribution of herpetofauna in caves of Portuguese karst massifs

Sérgio Marques, University of Aveiro, Portugal

#### 21

## Evaluation of the suitability of sinkhole ponds and springs from two Portuguese karst massifs for amphibian early life stage development

Sérgio Marques, University of Aveiro, Portugal

#### 22

## A new insight into the Stygofauna Mundi: assembling a global dataset for aquatic fauna in subterranean environments

Alejandro Martínez, National Research Council, Italy

#### 23

## Energetic contributions of cave cricket guano to the food base in caves in summer

Kathleen Lavoie, State University of New York College at Plattsburgh, USA

24

**Hiding deep underground – two new subterranean beetle genera for Slovenia** Maja Zagmajster, University of Ljubljana, Slovenia

#### 25

#### A comprehensive database for the cave fauna of Greece

Kaloust Paragamian, Hellenic Institute of Speleological Research, Greece

#### 26

#### Distribution of cave-dwelling pseudoscorpions (Arachnida) in Brazil

Maria Elina Bichuette, Federal University of São Carlos, Brazil

#### 27

## Population dynamics of two troglobite *Troglorhopalurus* (Scorpiones: Buthidae) scorpions from Brazil

Maria Elina Bichuette, Federal University of São Carlos, Brazil

#### 28

**Spatial distribution and population data of cave millipedes, genus** *Pseudonannolene* Silvestri, 1895 (Diplopoda, Spirostreptida) from Brazil Maria Elina Bichuette, Federal University of São Carlos, Brazil

#### 29

## Microbial biomass has a key role in immobilization of organic nitrogen in Russão II cave (Goiás, Brazil)

Caio Cesar Pires de Paula, Federal University of São Carlos, Brazil

#### 30

**Climatic conditions influence the presence of species in iron ore caves in Brazil** Xavier Prous, Vale S.A, Brazil 31

Subterranean biodiversity in a semi-arid tropical limestone outcrop: the role of cave microhabitats and aboveground landscape features in structuring invertebrate communities

Rodrigo Lopes Ferreira, Federal University of Lavras, Brazil

32

**Persistence and stability of cave streams invertebrate assemblages in Brazil** Rodrigo Lopes Ferreira, Federal University of Lavras, Brazil

#### 33

## The CAVEheAT project: climate change, thermal niche and conservation of subterranean biodiversity

David Sánchez-Fernández, Universidad de Castilla-La Mancha, Spain

- 18:00 (First group) Tourist Train Transfer to quay of Traditional Boat (Moliceiro). Place: In front of Reitoria Main Building
- 18:15 (First group) Moliceiro trip around Venice-like canals of Aveiro
- 18:15 (Second group) Tourist Train Transfer to quay of Traditional Boat (Moliceiro) Place: In front of Reitoria Main Building
- 18:30 (Second group) Moliceiro trip around Venice-like canals of Aveiro
- 20:00 End of activity in the quay of Traditional Boat (center of the city)

### Friday 24/08/2018

Place: Reitoria Main Building

#### 9:00–10:30 Session 11: Moderators: Martina Pavlek & Markus Friedrich

Plenary talk9:00–9:30David Culver, American UniversityEcological and Evolutionary Classification of Subterranean Organisms

9:30–9:45 Michael E. Slay, The Nature Conservancy Preliminary results from a survey of lava tube caves in the southwest region of the Ka'ū district of the Big Island, Hawai'i 9:45–10:00 Pedro Oromí, University of La Laguna **Pyroclast fields: a subsurface subterranean habitat suitable for troglobionts** 

10:00–10:15 Hans Jürgen Hahn, University of Koblenz-Landau Quantitative measurement of riverbed colmation and associated ecological studies on sediment fauna

10:15–10:30 \* Ester Premate, University of Ljubljana Locomotion of *Niphargus* amphipods from cave lakes and streams

#### 10:30–11:00 Coffee break

#### 11:00–12:30 Session 12: Moderators: Susana Pallarés & Jean-Jacques Geoffroy

Plenary talk 11:00–11:30 Peter Trontelj, University of Ljubljana Genetic structure and population size of the largest cave creature in the world, the olm (*Proteus anguinus*)

11:30–11:45 Martina Pavlek, University of Barcelona Unraveling the evolutionary history of the cave-dwelling Dysderidae in the Dinarides

11:45–12:00Arnaud Faille, CSIC-University Pompeu Fabra**The Pyrenean radiation of Trechini subterranean beetles** 

12:00–12:15 Michael Curran, Bennelongia Environmental Consultants **Comparison of eDNA and traditional troglofauna sampling methods** 

12:15–12:30 Nicole White, Curtin University What's the potential for environmental DNA (eDNA) to assess stygofauna and troglofauna: pilot studies from Western Australia

#### 12:30-14:00 Lunch

#### 14:00–16:00 Session 13: Moderators: Oana Moldovan & Florian Malard

Plenary talk14:00–14:30William Humphreys, Western Australian MuseumIs landscape evolution or climate change the driver of subterraneanbiodiversity in Cape Range, Western Australia?

14:30–14:45Susana Pallarés, University of Castilla-La ManchaLimited thermal acclimation capacity in cave beetles

14:45–15:00 \* Stefano Mammola, University of Turin On climate change and subterranean spiders

15:00–15:15 Thomas Hesselberg, University of Oxford **Behavioural adaptations of cave orb spiders** 

15:15–15:30 \* Ivan Campos-Filho, Federal University of Campina Grande Contributions to the terrestrial isopods (Crustacea, Isopoda, Oniscidea) from Brazilian caves

15:30–15:45 Hans Jürgen Hahn, University of Koblenz-Landau **The European groundwater water legislation – demand for groundwater ecological research coming from the new drinking water directive** 

15:15–16:00 Pavel Stoev, Pensoft Publishers Pensoft's ARPHA Publishing Platform top innovations in OA publishing as demonstrated by Subterranean Biology

16:00–16:30 Coffee break

16:30-18:30 General Assembly of the International Society for Subterranean Biology

18:30 Meeting of the new council of the International Society for Subterranean Biology

20:00 Conference Banquet Presentation of Best Student Presentations Awards Place: Meliá Ria Hotel & SPA



### Campus Map – University of Aveiro

#### **MAPA DO CAMPUS UNIVERSIDADE DE AVEIRO**

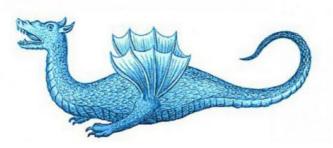
- UNAVE Associação para a Formação Profissional e investigação; UINFOC Unidade integrada de Formação Continuada; Jardim Infantil e ATL; IEUA incubadora de Empresas da Universidade de Aveiro Departamento de Línguas e Culturas
- Antiga Reitoria: Gabinetes dos Antigos Reitores; CESAM Centro de Estudos do Ambiente e do Mar; CICECO Instituto de Materials de Aveiro; Instituto Confúcio; TEMA Teonología 3 Mecânica e Automação
- Departamento de Eletrónica, Telecomunio ções e ini Departamento de Educação e Psicologie; Mediatece; UATEC - Unidade de Transferência de Tecnologia da Universidade 6 de Avein
- Serviços de Ação Social; Peletiónio de Santiago; Bacilio de Comeios; Agência Bandsiria; Paretarmácia; Centro de Cópias; Papalairia; Snack-Bar; Posto de Atandmento e Loja da AULAr; Caisa Autilizano; Centro de Saúde Universitário Instalações Centrais; Quiosque e Centro Ótico 8
- Departamento de Ambiente e Ordenamento
- Departamento de Biologia 8
- Departamento de Engenharia de Materiais e Cerâmica 10 Departamento de Economia, Gestão e Engenharia Industrial
- e Turismo
- 11 Departamento de Matemática
- 12 Departamento de Ciências Sociais, Políticas e do Território
- 13 Departamento de Física
- 14 Laboratório Central de Anália
- 15 Departamento de Química
- 16 Departamento de Geociências
- 17 Biblioteca, Informação Documental e Museologia; Sala de Exposições Hélène de Beauvoir
- 19 IT Instituto de Telecomunicações
- 20 ESTGA Escola Superior de Tecnologia e Gestão de Águeda
- Edifício Central; Edifício Eletromecânica; Auditório; Bar-Cantina; Edifício Docentes; Oficinas
- 21 Departamento de Comunicação e Arte 22 Departamento de Engenharia Mecânica
- Complexo Pedagógico, Científico e Tecnológico 24 IEETA - Instituto de Engenharia Elebrónica e Telemática
- de Aveiro
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- 25 Departamento de Biologia: Herbário e Laboratórios de Ensino
- 27 Serviços de Tecnologias de Informação e Comunicação
- 28 Departamento de Engenharia Civil
- 29 Complexo de Laboratórios Tecnológicos
- ESSUA Escola Superior de Saúde da Universidade de Aveiro; Departamento de Ciências Médicas; Centro de Saúde Universitário Instalações ESSUA
- 31 Fábrica Centro Ciência Viva; IEUA Incubadora de Empresas da Universidade de Aveiro
- 32 CICFANO Complexo Interdisciplinar de Ciências Fisicas Aplicadas à Nanotecnología e à Oceanografia
- 33 Edifício das Comunicações Óticas, Comunicações Rádio e Robótica
- 34 ESAN Escola Superior de Design, Gestão e Tecnologia da Produção Aveiro-Norte
- 35 ISCA-UA Instituto Superior de Contabilidade e Administração da Universidade de Aveiro
- 37 CESAM Centro de Estudos do Ambiente e do Mar 40 CCCI - Complexo das Ciências de Comunicação e Imagem
- B Residêncies de Estudantes
- C Residência de Docentes, Funcionários e Estudantes de
- Pós-graduação
- D IDAD - Instituto de Ambiente e Desenvolvimento
- Pavilhão Polidesportivo Prof. Dr. Aristides Hall E
- Snack-bar; Self-service; Restaurante Universitário
- Creche e Jardim Infantil G 1
- GRETUA Grupo Experimental de Teatro da UA Depósito de Água
- Plsta de Atletismo ĸ
- L Ponte Pedonal
- Complexo de Refeitórios do Crasto N Casa do Estudante: Sede da AAUAv - Associação
- Académica da UA
- Estacão Meteorológica
- PL Parque de Acesso Livre; PR Parque de Acesso Restrito; PP Parque Pago
- Livraria e Sala de Exposições Mestre Hélder Castanheira, Centro de Estudos de Jazz Q
- R Jardim da Ciência
- 8 Marinha Santiago da Fonte



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Serra d'Aire e Candeeiros Natural Park



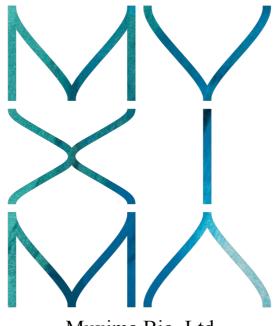
Institute of Nature and Forests Conservation



### Municipality of Santarém, Portugal



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