

## **Vienna Catchment Science Symposium, Saturday 14<sup>th</sup> April, 2018**

### **On the Theme of: 23 unsolved problems in Hydrology that would revolutionise research in the 21st century**

#### **Report**

We had excellent meetings on Friday 13 April 2018 (Splinter meeting at EGU in Vienna) and on Saturday 14 April (Vienna Catchment Symposium at TU Wien) with about 60 and 110 people attending, respectively.

These are the questions resulting from the LinkedIn discussion, the Friday Splinter meeting and additional email contributions received before Friday.

[https://iahs.info/uploads/Unsolved%20Problems%20in%20Hydrology/Questions\\_13\\_April\\_2018\\_edited\\_1613.pdf](https://iahs.info/uploads/Unsolved%20Problems%20in%20Hydrology/Questions_13_April_2018_edited_1613.pdf)

On Saturday we had three rounds of discussions in four break out groups and one final plenary discussion. In each round we discussed the questions, merged them, split them and reworded them as needed followed by a voting on prioritising the questions. The voting was for gold/silver/bronze/remove in each of the three break out group rounds. Only the gold and silver ones were retained for the plenary with an additional round of voting (by the entire plenary) for gold, silver or removing them from the list. The idea of the process was to whittle down the 260 questions initially proposed to a more coherent and smaller set of those questions deemed most important by the participants. The process resulted in 16 gold and 29 silver questions which are posted here.

[https://iahs.info/uploads/Unsolved%20Problems%20in%20Hydrology/Questions\\_14\\_April\\_2018\\_plenary.pdf](https://iahs.info/uploads/Unsolved%20Problems%20in%20Hydrology/Questions_14_April_2018_plenary.pdf)

A paper drafting team (Günter Blöschl, Elena Toth, Jeff McDonnell, Gia Destouni, Antonio Chambel, Elena Volpi, Jim Kirchner, Marc Bierkens, Christine Stumpp, Christophe Cudennec, Hubert Savenije, Murugesu Sivapalan, Aldo Fiori) has been formed to

- check whether there are any obvious holes' in the list and propose a small number of additional questions if needed
- wordsmith the questions
- start with an initial draft of the summary paper.

The updated list of questions will be circulated among the co-authors (those who have substantially contributed to the process which will be around 160 scientists) with a final voting on the list, and the co-authors will also be asked to provide suggestions for any changes to the paper draft.

The plan is to submit the paper to HSG.

Many thanks again for all your contributions  
Günter



## Vienna Catchment Science Symposium, Saturday 14<sup>th</sup> April, 2018

### On the Theme of:

### 23 unsolved problems in Hydrology that would revolutionise research in the 21st century

Hydrology research is rather fragmented, and this holds back progress. More strongly harmonising our research efforts will focus our research. An example of how this can be done has been shown by mathematician David Hilbert. He set out 23 unsolved mathematical problems at the beginning of the 20th century, which have greatly focused research in mathematics. Can we do something similar in hydrology?

What are the unsolved problems in hydrology that would revolutionise research in the 21st century and raise the level of excitement for the science? To make tangible progress, the problems should:

- (1) ideally relate to observed phenomena and why they happen;
- (2) they should be universal (i.e. not only apply to one catchment or region); and
- (3) they should be specific (so there is hope they can be solved).

In this symposium we aim to identify a set of unsolved problems in hydrology. The list cannot encompass everything we are doing in hydrology, so we need to set priorities. Through panel discussions, breakout groups and plenary sessions we will develop a list that can support all hydrologists to drive hydrology research forward.

<u>Time</u>	<u>Session</u>	<u>Location</u>
8:30	Tea, coffee, pastries and greetings	3 <sup>rd</sup> Floor Foyer
8:45	<b>Welcome and Introduction</b> Günter Blöschl, Vienna University of Technology, Austria	Kuppelsaal
8:50	<b>Where are the great unknowns and how can we find them?</b> Panelists present a short opening statement on some great unsolved problems they've encountered (5 mins each): Elena Toth, Jeff McDonnell, Gia Destouni, Elena Volpi, Marc Bierkens, Jim Kirchner Moderator: Günter Blöschl	Kuppelsaal
10:00	Tea and coffee	3 <sup>rd</sup> Floor Foyer
10:30	<b>Let's get to work generating a list of unsolved problems in hydrology</b> Four parallel discussion sessions to sort, merge, split and prioritize the list of unsolved problems identified Group 1 (moderator: Elena Toth) Group 2 (moderator: Jeff McDonnell) Group 3 (moderator: Gia Destouni) Group 4 (moderator: António Chambel)	Group 1: Kuppelsaal, Group 2: SR Kuppel Group 3: SR 212-232 Group 4: HS 14
12:15	Lunch	3 <sup>rd</sup> Floor Foyer
13:00	<b>Generating a list of unsolved problems in hydrology (2<sup>nd</sup> round)</b> Group 1 (moderator: Elena Volpi) Group 2 (moderator: Marc Bierkens) Group 3 (moderator: Jim Kirchner) Group 4 (moderator: Christine Stumpp)	See above
14:45	Tea and coffee	3 <sup>rd</sup> Floor Foyer

- 15:15**    **Generating a list of unsolved problems in hydrology (3<sup>rd</sup> round)**    See above  
Group 1 (moderator: Christophe Cudennec)  
Group 2 (moderator: Hubert Savenije)  
Group 3 (moderator: Alberto Montanari)  
Group 4 (moderator: Aldo Fiori)
- 16:30**    **Plenary: finalising the list of unsolved problems**  
Moderator: Günter Blöschl
- 17:30**    Evening drinks reception followed by dinner    3<sup>rd</sup> Floor Foyer

Location: **Kuppelsaal**, TU Wien. Karlsplatz 13, 4<sup>th</sup> floor, 1040 Vienna

See <https://www.linkedin.com/groups/13552921> for the IAHS discussion forum