

REPORT ON ROSIP 2016

Report on the Joint IEEE SPS and EURASIP
Summer School on Robust Signal Processing
(RoSiP 2016) in Rudesheim (Rhine), Germany,
Sept. 19th-24th 2016

Michael Muma and Abdelhak M. Zoubir
October 19, 2016

2016 Joint IEEE SPS and EURASIP Summer School on Robust Signal Processing

Rüdesheim am Rhein (Germany) - 19-24 September 2016



image source: iStock.com/mstamatics

Call for Participants

Overview

The 2016 Joint IEEE Signal Processing Society (SPS) and European Association for Signal Processing (EURASIP) Summer School on Robust Signal Processing is organized by the Signal Processing Group at Technische Universität Darmstadt. We invite Ph.D. students, early career researchers and engineering practitioners to participate in the Summer School, what promises to be a unique event run by world-class experts.

The Summer School provides insights on advances in statistical signal processing with emphasis on robust statistics for signal processing. Participants will have the opportunity to learn and study innovative robust methods and algorithms for signal processing and engineering at large supported by numerous advanced real-life applications.

The material will be presented in an interactive and stimulating way: each day, after the lectures, the speakers will be available for face-to-face discussion with the participants who are interested in deepening some of the material covered in the talks. Participants will have also the opportunity to present their own work, if they wish so, and get feedback from other participants as well as from the lecturers.

The Summer School has received full international recognition and sponsorship from the IEEE SPS, EURASIP and numerous organizations, which allows affordable prices at a top-class touristic and historical location.

Participation

The Summer School is open to about 50 Ph.D. students, early career researchers and engineering practitioners.

Venue

The Summer School will be held at the historic hotel "Zum grünen Kranz", located in the historic city center of Rüdesheim am Rhein, Germany. Rüdesheim is a picturesque winemaking town in the Rhine Gorge and thereby part of the UNESCO World Heritage Site.

The venue can be reached by car (45min) or train (80min) from Frankfurt Airport. Accommodation is available on-site. Up to 40 students can be accommodated in shared and double rooms at a special rate. Lunches (soup, pasta, regional cuisine, salad etc.) including soft drinks, coffee breaks (including cookies, cake and fruit) are included in the registration fee. An exciting excursion along the Rhine will be organized during the Summer School as a special social event.



image source: iStock.com/Mo-Jo-Lo



image source: www.gruenerkranz.com



image source: iStock.com/cmfotoworks

Program

The following tutorials are to be held:

„Robust Norms in Sparse Representations and Compressed Sensing”,
Gonzalo Arce, University of Delaware,
Newark, Delaware, USA

„Robust and Scalable Bootstrap for Large Scale Data Analysis”,
Visa Koivunen, Aalto University,
Helsinki, Finland

„Regularized M-estimators of the Covariance Matrix”,
Esa Ollila, Aalto University, Helsinki,
Finland

„Robust Estimation, Random Matrix Theory and Applications to Signal Processing”,
Frédéric Pascal, École Supérieure d'Électricité, Gif-sur-Yvette, France

„Robust Signal Processing for Dependent Data with Applications in Biomedical Signal Processing”,
Abdelhak Zoubir and Michael Muma,
Technische Universität Darmstadt,
Darmstadt, Germany

Contact

For more information please visit

rosip2016.org

or send a message to

summerschool@spg.tu-darmstadt.de



1 Scope of the Summer School

The 2016 Joint IEEE Signal Processing Society (SPS) and European Association for Signal Processing (EURASIP) Summer School on Robust Signal Processing was organized by Prof. Abdelhak M. Zoubir and Dr.-Ing. Michael Muma of the Signal Processing Group at Technische Universität Darmstadt. We invited Ph.D. students, early career researchers and engineering practitioners to participate in the Summer School, what turned out to be a unique event run by world-class experts.

The Summer School provided insights on advances in statistical signal processing with emphasis on robust statistics for signal processing. Participants had the opportunity to learn and study innovative robust methods and algorithms for signal processing and engineering at large supported by numerous advanced real-life applications.

The material was presented in an interactive and stimulating way: each day, after the lectures, the speakers were available for face-to-face discussion with the participants who were interested in deepening some of the material covered in the talks. Participants also had the opportunity to present their own work, if they wished so, and received feedback from other participants as well as from the lecturers. An examination was held for those who were interested.

The Summer School has received full international recognition and sponsorship from the IEEE SPS, EURASIP, which allowed affordable prices at a top-class touristic and historical location. The wine hotel “Zum Grünen Kranz” at which the summer school was held provided special student rates. An exciting excursion along the Rhine was organized during the Summer School as one of many social events that helped to create a positive group dynamic and atmosphere.

2 Program of the Summer School

The following figure summarizes the program of the summer school.

	Sunday 18.9.	Monday, 19.9.	Tuesday, 20.9.	Wednesday, 21.9.	Thursday, 22.9.	Friday, 23.9.	Saturday, 24.9.	
09:00		Gini, Welcome	Arce, Rob. Norms CS	Pascal, Rob. RMT	Ollila, Rob.Reg. Cov	Koivunen, Boot. B. Data	Monument Tour, Rhine Cruise and Middle Age Market (optional)	09:00
		Zoubir, Rob. Basics						
10:20		Coffee	Coffee	Coffee	Coffee	Coffee		10:20
10:40								10:40
		Zoubir, Rob. Regres.	Arce, Rob. Norms CS	Pascal, Rob. RMT	Ollila, Rob.Reg. Cov	Koivunen, Boot. B. Data		
12:00		Lunch	Lunch	Lunch	Lunch	Lunch		12:00
14:00		Muma, Dependent	Arce, Rob. Norms CS	Pascal, Rob. RMT	Ollila, Rob.Reg. Cov	Koivunen, Boot. B. Data		14:00
15:20		Coffee Break	Coffee Break	Coffee Break	Coffee Break	Coffee Break		15:20
15:40			Talk to Koivunen	Talk to Pascal	Talk to Ollila	Talk to Arce		15:40
16:10		Muma, Dependent		Poster Session		Exam (optional)		16:10
17:00		Talk to Zoubir, Muma					17:00	
17:30							17:30	
19:00							19:00	
	Welcome Dinner (optional)	Historical City Tour (optional)	Special Dinner (optional)	Chill-Out Vineyard (optional)		Wine Tasting (optional)		
21:00							21:00	
23:00							23:00	

2.1 Tutorials

The following tutorials were held:

- **Abdelhak M. Zoubir**, Technische Universität Darmstadt, Darmstadt, Germany:
Introduction to Robust Signal Processing
- **Michael Muma**, Technische Universität Darmstadt, Darmstadt, Germany:
Robust Signal Processing for Dependent Data with Applications in Biomedical Signal Processing
- **Visa Koivunen**, Aalto University, Helsinki, Finland:
Robust, Scalable and Fast Bootstrap Method for Analyzing Large Scale Data
- **Visa Koivunen**, Aalto University, Helsinki, Finland:
Robust and Sparse Estimation of Tensor Decompositions
- **Frédéric Pascal**, École Supérieur d'Électricité, Gif-sur-Yvette, France:
Robust Estimation, Random Matrix Theory and Applications to Signal Processing
- **Esa Ollila**, Aalto University, Helsinki, Finland:
Regularized M-estimators of the Covariance Matrix
- **Gonzalo R. Arce**, University of Delaware, Newark, Delaware, USA:
Introduction to Compressed Sensing
- **Gonzalo R. Arce**, University of Delaware, Newark, Delaware, USA:
Robust Norms in Signal Processing and Compressive Sensing

2.2 Meet the Speakers

Every day, after the talks, a session entitled “Meet the Speakers” was organized. Here, the participants very actively engaged in discussions not only about the presented material, but also, about links to their own research. In addition to these dedicated sessions, all speakers were frequently addressed during the entire week by participants, who were interested in deepening their knowledge.

2.3 Poster and Presentation Session

On Wednesday, September 21, an interactive poster and presentation session took place, where the Summer School participants presented their own work. The students briefly summarized their research topic in a presentation session. This was followed by a detailed discussion with the speakers and colleagues during the subsequent poster session. During the entire week, students approached the speakers on how to best integrate robust statistics into their current research topics. Some of these discussions are still ongoing and may even lead to joint publications.

2.4 Final Examination

A final examination was held on Friday, September 23 for those who wished to do so. The multiple choice questions concerned all topics that were dealt with in the talks. All five students who took the examination passed.

2.5 Availability of the Presented Material

The slides of all tutorials are available at the Summer School homepage.

<http://rosip2016.org/>

Furthermore, for the talks of Abdelhak M. Zoubir, Michael Muma, Frédéric Pascal, Esa Ollila and Gonzalo R. Arce, audio has been recorded using a dedicated software that simultaneously captures the slide transitions and audio. This material is currently being processed and will be uploaded to the IEEE SPS Resource Center, the EURASIP library, the Technische Universität Darmstadt Open Lectures Archive (<https://www.openlearnware.de>) and the RoSiP homepage.

2.6 Social Events

Thanks to the sponsorship from the IEEE SPS, EURASIP, this Summer School included unique and diverse social events, which helped in creating positive group dynamics and making the School a pleasurable and memorable event. Especially the international participants, who came from more than 20 different countries, could learn about the local culture. Rudesheim am Rhein is a winemaking town which is part of the UNESCO World Heritage Site. The town lies at the foot of the Niederwald on the Rhine's east bank on the southern approach to the

Lorelei and is one of Germany's biggest tourist attractions. Only Cologne Cathedral draws more tourists from other countries. All social events which were organized by the Summer School were optional to those who were interested in joining and free of cost.

On Sunday, 18 September, upon arrival, a four-course welcome dinner was organized at the historical hotel and wine restaurant "Zum Grünen Kranz". A warm welcome was granted and the participants could get to know each other while enjoying local wine and food.

On Monday, 19 September, a historical guided city tour of Rudesheim was undertaken and the participants learned about the long history that goes back far beyond the the first documentary mention in 1074. Wine making, for example was introduced by the Romans to this region more than 2000 years ago.

On Tuesday, 20 September, a further free four-course dinner was organized at the historical hotel and wine restaurant "Zum Grünen Kranz".

On Wednesday, 21 September, after the Poster Session, the Summer School organized a social event (Chill-Out in the Vineyards). The event included a hike to a nearby plateau, from which the participants enjoyed a spectacular view of Rudesheim and the Rhine Valley. Beach chares, wine and snacks were supplied and thanks to the wonderful weather a pleasurable and very unique event took place.



Figure 2.1: Group picture taken on Wednesday evening during the Chill-Out in the Vineyards social event. The view includes Rudesheim which is located on the left side of the Rhine valley.

On Thursday, 22 September, the Summer School participants were given the evening off and engaged in self-organized group events.

On Friday, 23 September, a historical wine tasting was organized in a more than 500 year old wine cellar.



Figure 2.2: Friday's wine tasting social event took place in a more than 500 year old wine cellar.

Saturday, 24 September was reserved to a special social event, the monument tour. This half-day trip contained a boat tour on the Rhine river and a cable car tour to the Niederwald-denkmal, which is a monument located in the Niederwald landscape park, near Rüdesheim am Rhein. It overlooks the valley of the Rhine and was built in the 1870/80s to commemorate the Unification of Germany.

3 ACCOMMODATION AND LECTURE ROOM

The speakers were accommodated at the Hotel "Zum Grünen Kranz". Breakfast and lunch for all participants and speakers was organized at the associated restaurant. Coffee Sessions were held adjacent to the seminar room, which is located in the "Burg hotel", see Figure 3.1.

The entire "Burg Hotel" was reserved for the Summer School which offered budget accommodation (34 Euro per night including breakfast) to the participants. Having all students located in the same building, which also contains the lecture room was beneficial, amongst others for the group dynamics. One drawback of the historic location, was that, unfortunately, only a small lecture room was available for the tutorials, see Figure 3.2.



Figure 3.1: The student accommodation and seminar room were both located in the Burg Hotel, which is the red building in this picture.



Figure 3.2: Prof. Zoubir providing a tutorial talk on robust statistics in signal processing.



Figure 3.3: The student accommodation also offered space for many scientific discussions amongst the Summer School participants.

4 FACTS AND NUMBERS

4.1 NUMBER OF ATTENDEES BY CATEGORY

Table 5.1 displays the Number of attendees by category. Membership is understood any of the IEEE-SPS and EURASIP societies. Non-membership occurs if an individual is not affiliated to any of the two.

Table 4.1: Number of attendees by category.

Category	Number
Student Registrations (members)	11
Student Registrations (non-members)	7
Registrations (members)	5
Registrations (non-members)	4

4.2 NUMBER OF NEW EURASIP MEMBERS

The following table summarizes the new EURASIP members. A free one year membership was granted to all non EURASIP members who participated in the Summer School. For IEEE SPS membership, see Section 5.

Table 4.2: New EURASIP members.

Category	Number
New Student Members	11
New Members	6

4.3 FORECAST OF FINANCIAL PERFORMANCE

Table 4.3: Forecast of Financial Performance in Euro.

Item	Price/Unit	Units	Total
Income			17379,76
Student Registrations (members)	150,00	11	1650,00
Student Registrations (non-members)	200,00	7	1400,00
Registrations (members)	250,00	5	1250,00
Registrations (non-members)	400,00	4	1600,00
IEEE SPS contribution	4479,76	1	4479,76
EURASIP contribution	5000,00	1	5000,00
LOEWE NICER ¹	2000,00	1	2000,00
Expense			17068,98
Coffee Breaks, Lunches & Dinners			4317,70
Soocial Events			1695,20
Materials & Equipment Rental			1534,40
EURASIP Membership Fees			630,00
Speakers Honorarium	500,00	6	3000,00
Speakers Travel Expenses			3267,84
Speakers Accommodation			2623,84

¹ LOEWE refers to Landes-Offensive zur Entwicklung Wissenschaftlich-ökonomischer Exzellenz (LOEWE) that funds university projects in Hesse (<https://wissenschaft.hessen.de//ueber-uns/english-information>). NICER stands for Networked Infrastructureless Cooperation for Emergency Response and is a LOEWE Research Priority Program that is located at TU Darmstadt (<https://www.nicer.tu-darmstadt.de/en/nicer/overview/>).

5 EVALUATION OF THE IEEE SPS PARTICIPANT FEEDBACK QUESTIONNAIRE

5.1 QUESTION 1: OVERALL, HOW SATISFIED WERE YOU WITH THIS SUMMER SCHOOL?

Table 5.1: Overall, how satisfied were you with this summer school?

Category	Absolute Value	Percentage
Very satisfied	20	87%
Moderately satisfied	3	13%
Neutral	0	0 %
Unsatisfied	0	0 %

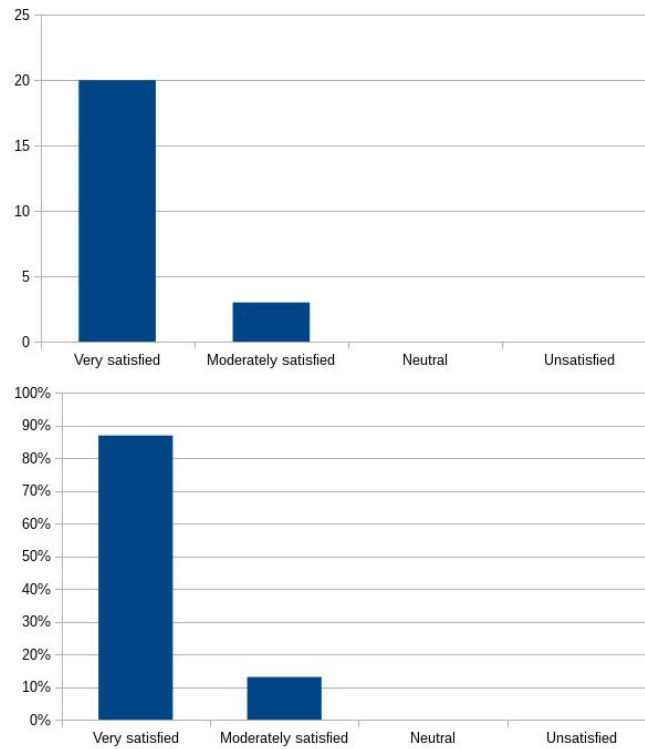


Figure 5.1: Response to Question 1: Overall, how satisfied were you with this summer school?

5.2 QUESTION 2: WOULD YOU BE INTERESTED IN ATTENDING A FOLLOW-UP SUMMER SCHOOL NEXT YEAR ON A RELATED TOPIC?

Table 5.2: Would you be interested in attending a follow-up summer school next year on a related topic?

Category	Absolute Value	Percentage
Yes	21	95%
No	1	5%

5.3 QUESTION 3: ARE YOU CURRENTLY AN IEEE MEMBER?

Table 5.3: Are you currently an IEEE Member?

Category	Absolute Value	Percentage
Yes	12	52%
No	11	48%

5.4 QUESTION 4: ARE YOU CURRENTLY AN IEEE SIGNAL PROCESSING SOCIETY MEMBER?

Table 5.4: Are you currently an IEEE Signal Processing Society Member?

Category	Absolute Value	Percentage
Yes	12	55%
No	10	45%

5.5 PLEASE DESCRIBE WHAT YOU LIKED ABOUT THIS SUMMER SCHOOL.

The feedback that was provided by the attendees of the Summer School is grouped in three main topics. (i) Lectures and lecturers (ii) atmosphere and location (iii) organization (iv) other topics.

(i) Lectures and lecturers:

- The variety of topics and the experience of the speakers in diverse fields was very great.
- Very well prepared lectures. The program and lectures were quite well-defined. The lectures were very good.
- The material presented was most interesting and it was presented in the most excellent way.
- Specialists in specific fields.
- There were spaces to discuss with them and clarify concepts about robustness and how it can be used in some problems of the participants.
- The topic of robust statistics was covered substantially in the summer school. Various aspects of this field were explained in detail.
- I enjoyed listening to the lectures.
- The lectures were very interesting.
- I enjoyed the variety of expertise of the lecturers as well as the participants which enabled interesting discussions along with learning about different applications.
- Great speakers who provided a good coverage of the summer school topics
- I especially appreciated the distribution of different themes during the week. We started with the basics elements of robust estimation / detection theory and we have addressed specific and varied topics during all the week. As far as I'm concerned, I enjoyed the general presentations of Monday, the presentation on the bootstrap's methods and those associated with compressed sensing (Friday).
- The course topics were interesting, timely and very well explained by the speakers.
- This summer School provided me several tools that I did not know. I'm pretty sure I can relate them to my work, and then improve the methods I am using.
- Covered aspects of robust estimation from different perspectives.
- Very competent speakers.
- Balanced programme.
- I liked both the technical content (some talk more, some other less) and the social events.
- very good presenters and speakers
- very good representation of knowledge
- brilliant selection of topics
- The topics were presented in a clear (scholar-like) manner. The presenting tempo was perfect to be followed (not too much information at a short time period); the breaks were with an appropriate length (allowing for sitting up and having small discussions).
- All the lectures were very interesting. The organizers made an excellent selection of leading experts in robust statistics.
- The idea was described in detail and without any prior knowledge on robustness, I was able to apply these ideas to some of my own problems.
- The best thing is that all the lectures are highly related with the latest progress of robust signal processing on many practical applications. The Summer School offer the attendees an opportunity to freely communicate with the speakers to clarify some confusions and details about the talks.
- High quality lectures on selected topics in the area of robust signal processing

Atmosphere and location:

- The place selected also was excellent to have some comfort, with a beautiful landscape and history to enjoy. The location of the course was also very nice.
- Meeting people from all over the world.
- Good atmosphere for constructive talks.
- I also liked the organized social activities that took place after the lectures each day and that all school participants lived together.
- The arrangements for the social activities and the venue in the beautiful town of Ruedesheim were remarkably good.
- The social activities were interesting and they gave me the chance to talk to different people.
- It was held on a historic location.
- The organizers arranged food and accommodation at reasonable rates.
- The social events were all nice experience.
- The thing I enjoyed most was the diversity of people attending the school, both in the sense of people coming from all around the world and from different areas of expertise. The first helped in making friendly connections and the second in professional ones.
- The place (Rüdesheim) was nice, and the social activities well organized. Having a housing with shared rooms was positive for getting along with the course mates. All of it improved networking and exchange of ideas.
- I met a lot of people that I can connect to, and most of them are staying in my network.
- I loved the place and all the presented activities.
- Many Chances to interact with other people.
- Relatively small group made it easy to interact with the speakers and participants.
- Location (small village) made it easy to focus on the programme.
- It was a very friendly and productive atmosphere, perfectly design to allow PhD students and young researcher to meet and talk together.
- nice location

Organization:

- The organizer spent a lot of time to organize the course and the activities at their best quality.
- The summer school was well organized
- I congratulate the organizers especially Mr. Michael Muma for putting so much effort for the event.
- The organizers did a very good job for planning the social activities.
- The summer school was very well organized
- Well organized, not expensive
- Honestly, everything was great. Organizer, Dr. Muma is the best organizer ever I've seen. I hope this event to be continued.
- very good organization
- Moreover, the organization of the accommodation and social events was very good.

Others Topics:

- One week is the optimal duration for such a summer school

5.6 PLEASE DESCRIBE WHAT YOU THINK CAN BE IMPROVED.

The feedback that was provided by the attendees of the Summer School is grouped in three main topics. (i) everything perfect, (ii) more implementation and basics during the lectures (iii) small lecture room (iv) other topics

(i) Everything perfect

- I do not have any suggestion to make, for me everything was a success
- Everything was perfect (courses, organization and activities).
- Considering the organization, NOTHING!
- For a five day course, I find it extremely satisfying
- Objectively speaking, all the things (the selected topics of lectures, accommodation, and social activities, etc.) of this Summer School are perfect.

(ii) More implementation and basics during the lectures

- Training and implementation of the presented materials/methods (of course it is possible only if everyone brings his own laptop). The range of materials was extensive, repetitions may be beneficial for students not fully familiar with the presented topics.
- Probably some of the speakers could spend a little more time on the basics and then switch to higher level concepts.
- Also, it would have been great to have a lab session or something like an (optional) exercise sheet for further learning on the session topics, at least for the first session with the basics.
- Maybe, for the classes, make a little more room for "real-life" experience / simulation results and applications.
- Some of the sessions or part of them presented heavy material in a short period of time.
- Be sure that all the talks are of tutorial style, taking into account the kind of audience.
- Adding more applied examples in the finishing parts of the lectures.

(iii) Small lecture room

- improved in my idea was the lecture room which was a little small
- The only thing that was not optimal with the summer school was the room in which the lectures were held. The room was a bit too small given the number of participants.
- The event hall or room can be more of academic standard
- The condition of the lecture room was not optimum, to the point that the lack of space for sitting and writing affected the quality of learning, at least for me.
- The classroom can be bigger, the hotel room can also be bigger.
- The classroom was small for the number of people in the school and there were no blinds for the sunlight. There was also some noise because of the trucks and trains passing through the place that made it difficult to concentrate.

(iv) Other topics

- I think that the major social event should not have been set for the last day, because I believe that some people wished to take part in it, but had to leave due to inflexible travel arrangements.
- I only hope to see lecture notes before class. It was a little difficult to follow without background.
- In my opinion, having the slides of the lectures in advance (one week before the summer school, for example) could be helpful.

5.7 PLEASE USE THIS SPACE TO PROVIDE ANY ADDITIONAL COMMENTS.

- Thank you for the solid preparation of the conference/school. I'm looking forward for next events. I'm hoping to get the audio recordings of the presented lectures.
- I think that Dr Michael Muma did a great job organizing the summer school.
- It would be nice if prerequisites or other supporting course materials are provided in advance so that attendees can better prepared for making maximum out of the summer school
- It looks like it is typical to have one session about basic concepts and applications, and four sessions devoted to the latest advances. Since much more students than senior researchers attend this style of summer school, I would suggest to organize two sessions about basics and applications, and devote the other 3 days to cuttingedge research, and not necessarily allotting a whole day to a single speaker.
- Thank you again for everything and for sharing the contact info of everyone.
- Honestly, everything was great. Organizer, Dr. Muma is the best organizer ever I've seen. I hope this event to be continued.
- Thank you!
- I strongly encourage the organizers to think of a follow-up summer school next year or in 2018 on a related topic.
- I will recommend this summer school to other colleagues. Thanks!
- Great job in choosing the location and organizing the lectures and especially the social events! For the next summer school please follow similar guidelines.

6 IMPRESSIONS FROM THE SUMMER SCHOOL



Figure 6.1: The view at the Chill-out in the Vineyards social event was spectacular.



Figure 6.2: A cable car ride took the summer school participants back from the Niederwalddenkmal.



Figure 6.3: Summer School participants during a boat tour on the Rhine.



Figure 6.4: Some participants of the special social event.



Figure 6.5: The view from the lecture room window: the Brömserburg, which was built between 1086–1190.