INTERNATIONAL ASSOCIATION FOR PATTERN RECOGNITION – TC 11 (READING SYSTEMS)

ANNUAL REPORT TO THE EXECUTIVE COMMITTEE, SEPTEMBER 2016

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http://www.iapr-tc11.org/

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1 BACKGROUND INFORMATION

1.1 TC11 LEADERSHIP TEAM

For the past six years, TC11 has constituted a leadership team, which is in charge of supporting the research community and its activities. The structure of the leadership team comprises the following roles.

Role	Name	Affiliation	Email
Chair	Koichi Kise	Osaka Prefecture University, Japan	kise@cs.osakafu-u.ac.jp
Vice Chair	Dimosthenis Karatzas	Computer Vision Centre, Spain	dimos@cvc.uab.es
Webmaster	Masakazu Iwamura	Osaka Prefecture University, Japan	masa@cs.osakafu-u.ac.jp
Dataset Curators	Marcus Liwicki	German Research Center for Artificial Intelligence (DFKI)	liwicki@dfki.uni-kl.de
	Volkmar Frinken	Onu Technology, San Jose, CA, USA UC Davis, Davis, CA, USA	volkmar@onutechnology.com
Newsletter Editor, Education Officer	Gernot Fink	TU Dortmund University, Germany	Gernot.Fink@tu-dortmund.de

The leadership team was renewed at the beginning of the current period (2014-16), and has been updated to reflect the needs of the TC as required.

During 2015, Dr Volkmar Frinken has joined the TC11 leadership team, in order to assist with the collection and archiving of TC11 public resources, one of the key activities of the TC that due to increased demand required more dedication.

During 2016, Prof Gernot Fink, originally acting as a newsletter editor, has also taken on a new responsibility as education chair. The decision was made in the light of two factors: the first is

the continuous organization of the doctoral consortium in the context of the ICDAR conference series (TC11's main activity), the second is the decision, jointly with TC10, to actively promote and the organization of a TC10/TC11 endorsed biennial summer school, starting in 2016, for which TC10 and TC11 would assume an advisory role.

TC11 has a limited number of activities that require financial support. At the time being we consider that a dedicated treasurer position is not required and the vice-chair acts in this responsibility.

1.2   TC WEBSITE URL

http://www.iapr-tc11.org/

1.3   NUMBER OF MEMBERS

As of September 13th, 2016, there are 1,057 subscribers to the TC-11 mailing list.

1.4   COMMUNICATION TYPES USED AND FREQUENCY

The main communication channel we use is the TC11 email newsletter, that is sent out once a month. See section 2.2.2 for details.

1.5   LISTING OF KEY EVENTS USUALLY ORGANISED BY THE TC

The TC11 organises the following events biennially:

	Event	Frequency	Topic area
ICDAR	International Conference on Document Analysis and Recognition	biennial, odd years	all fields on document analysis and recognition
ICFHR	International Conference on Frontiers in Handwriting Recognition	biennial, even years	handwriting recognition and its related areas

	Event	Frequency	Topic area
DAS	International Workshop on Document Analysis Systems	biennial, even years	document analysis methods and systems

In addition, TC11 and its members are involved in the following workshops which are held in conjunction with major events such as ICDAR and ACCV:
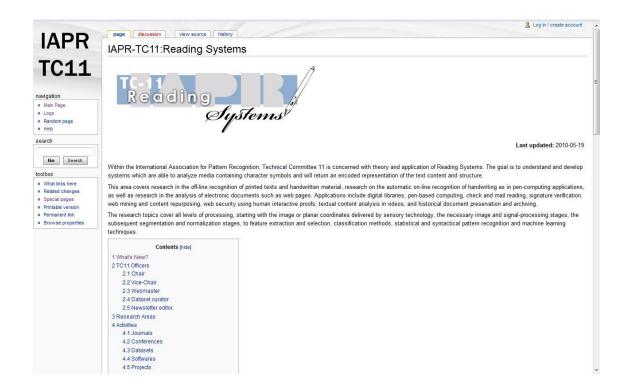
	Event	Frequency	Topic area
CBDAR	International Workshop on Camera-Based Document Analysis and Recognition	biennial, odd years	camera-based analysis of documents
MOCR	International Workshop on Multilingual OCR	biennial, odd years	methodologies for multilingual document analysis systems with particular focus on OCR
HIP	Historical Document Imaging and Processing	Biennial, odd years	imaging, collection, and processing of historical documents
AFHA	Workshop on Automated Forensic Handwriting Analysis	Biennial, odd years	Signature and HW verification / identification, intra- and inter-writer variations
IWRR	International Workshop on Robust Reading	Biennial, even years	Scene text localisation, segmentation, and recognition, born-digital and video text

2   ACTIVITIES IN THE LAST SIX MONTHS

2.1   WEBSITE UPDATES

We continuously maintain and update the TC11 website. Latest additions include the opening of a dedicated section for managing datasets (see section 2.1.6), as well as making public new guidelines and the call for the TC10/11 Summer School organisation (see section 2.2.1)

2.1.1 EDUCATIONAL INFORMATION

A list of activities related to education is described in length in the sections below.

FOCUS ON STUDENT MEMBERS OF THE TC

As part of our responsibility to support the international research community, we strive to ensure that students benefit as much as any other member of the community through attendance at our conferences and workshops. Certain efforts are directed specifically at students to contribute to their training and to the successful development of their careers, as well as to encourage their continued involvement in the field.

At our three major conferences – ICDAR, DAS and ICFHR – as well as in most TC11 endorsed satellite workshops, IAPR Best Student Paper Awards are given to encourage student participation. See, for example, the following websites for more details.

- ICDAR: http://www.icdar2013.org/program/awards
            http://2015.icdar.org/program/awards-winners/
- DAS: http://das2014.sciencesconf.org/resource/page/id/27
- ICFHR: http://www.icfhr2014.org/

Support for lower student registration fees at our conferences: students are always allowed to have lower registration fees at all TC11 conferences. In addition, efforts are also made to arrange for lower-cost student accommodations when possible.

2.1.2   TUTORIALS

Over the past period, the following tutorials have been organised in relation to TC11 activities:

Handwritten Text Recognition: Word-Graphs, Keyword Spotting and Computer Assisted Transcription, M. Pastor, V. Romero, J.A. Sánchez, A.H. Toselli and E. Vidal, 1-day tutorial in the context of ICFHR 2014

Automatic signature verification: state of the art and recent trends, A. Marcelli, G. Pirlo, M. Liwicki, M. Blumenstein, half day tutorial in the context of ICFHR 2014

Statistical Models for Handwriting Recognition and Retrieval, G.A. Fink, half day tutorial in the context of ICFHR 2014

Everything you always wanted to know about Tesseract, R. Smith, half day tutorial in the context of DAS 2014

Building Scalable Solutions for Document Retrieval and Recognition, C.V. Jawahar, P. Kompali, half day tutorial in the context of DAS 2014

Scene-Text Localization, Recognition, and Understanding, Albert Gordo (Xerox Research Center Europe) and Lluís Gómez i Bigordà (Computer Vision Center, Universitat Autonòma de Barcelona), half day tutorial in the context of DAS2016

Tesseract Blends Old and New OCR Technology, Ray Smith (Google Inc) , half day tutorial in the context of DAS2016

Planned for 2016:

Forensic Document Examination: state of the art and open issues, A. Marcelli, M. Liwicki, D. Impedovo, I. Malik, M. Blumenstein, full day tutorial in the context of ICFHR2016

Deep Representation Learning for Handwriting Recognition, Tonghua Su, Guoqiang Zhong, full day tutorial in the context of ICFHR2016

2.1.3 DESCRIPTION OF APPLICATION AREAS

- Character and symbol recognition
- Printed/Handwritten text recognition
- Language and script recognition
- Graphics analysis and recognition
- Document processing
- Layout Analysis
- Document information extraction (spotting, entity extraction, etc.)
- Forms reading and parsing
- Mathematical, chemical expressions analysis
- Historical documents and digital libraries
- Document retrieval
- Document based forensics
- Writer identification, Forgery detection
- Signature verification
- Camera and video based scene text analysis
- Text-based image retrieval

2.1.4 EXAMPLES OF SUCCESSFUL PROJECTS

There are many examples of successful projects within the research community, but the TC itself does not directly engage in projects beyond those described elsewhere in this report.

2.1.5 DEMOS

The TC itself does directly engage in creating or hosting demos, although certain demo software is hosted or indexed in the TC11 Web site (see section 2.1.6)

2.1.6 REFERENCE RESOURCES (DATASETS, EVALUATION TOOLS)

A priority of TC-11 is to encourage and actively promote the open access to research material and resources related to our research field. In this regard the following actions have taken place over the past year.
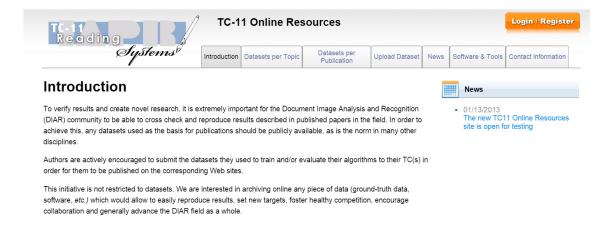
RESOURCES WEB PORTAL

We have recently released an improved Web interface for submitting material to TC-11 that allows among others:

- Online submission of material, including direct uploading of related files
- Unique identifiers for submitted datasets for easy referencing
- Easy versioning
- User ranking
- Downloads counts (which provides an indirect measure of relevance / quality)
- User comments

The new Web portal can be found at http://tc11.cvc.uab.es/

The development of the Web portal has been funded through profits from IAPR related activities ($ 1,297 from the RNN/LSTM tutorial in ICDAR 2013) as well as financial support at the level of 2,520 EUR from the IAPR ExCo. It is our intention to continue the development of this platform, and make it available to other IAPR TCs.

The hosting of datasets and other resources is currently taken care of through infrastructure provided by members of the TC11 leadership team. We consider that hosting of Web pages, including hosting space for datasets, should eventually be tackled centrally for all TCs at the IAPR level.

TC-11 OFFERED RESOURCES – EVOLUTION AND OUTLOOK

We have continued collecting new datasets and software. Our strategy over the past years has been to attempt to host material directly on the TC-11 site to ensure a stable repository,

rather than provide unstable external links to resources. The majority of datasets on the TC-11 Web site are indeed increasingly hosted by TC-11. We consider this is a major success of TC-11 and an important contribution to the field.

An overview of the current list of resources made available through the TC11 Web site is provided in Table 1.

Table 1. List of resources made available online through the TC11 Web site (compiled July 2015)

Resource Name	Submission Date	Status
Complex Text Containers		
A Dataset for Arabic Text Detection, Tracking and Recognition in News Videos (AcTiV)	Mar 2016	Archived
IIIT 5K - Word	Feb 2015	Archived
LRDE Document Binarization Dataset	May 2013	Archived
RETAS OCR Evaluation Dataset	May 2013	Linked
MSRA Text Detection 500 Database (MSRA-TD500)	Oct 2012	Archived
The Street View Text Dataset	Oct 2012	Archived
The Street View House Numbers (SVHN) Dataset	Jan 2012	Archived
NEOCR: Natural Environment OCR Dataset	Oct 2011	Archived
KAIST Scene Text Database	Jan 2011	Archived
ICDAR 2003 Robust Reading Competitions	Jun 2011	Archived
ICDAR 2005 Robust Reading Competitions	Jun 2011	Archived
Machine-printed Documents		
TANGO-DocLab web tables from international statistical sites	Mar 2016	Archived
DFKI Dewarping Contest Dataset (CBDAR 2007)	Mar 2011	Linked
PRImA Layout Analysis Dataset	Jan 2011	Linked
Table Ground Truth for the UW3 and UNLV datasets	May 2010	Archived

The DocLab Dataset for Evaluating Table Interpretation Methods	Aug 2010	Archived
APTI: Arabic Printed Text Image Database	Nov 2009	Linked
Graphical Documents		
TradeMarks Image Database	Sep 2012	Archived
Braille Dataset - Shiraz University	Jul 2011	Archived
Chem-Infty Dataset	Jun 2010	Archived
Mixed Content Documents		
Tobacco800 Document Image Database	Jan 2011	Linked
Handwritten Documents		
Signature Verification (SigWiComp2013)	Feb 2015	Archived
ICFHR 2014 CROME competition, for mathematical symbols	Feb 2015	Archived
ICFHR 2013 Gender Identification Competition Dataset	Jan 2015	Archived
Persian Heritage Image Binarization Dataset (PHIBD 2012)	May 2013	Archived
The Rimes Database	May 2013	Linked
ICFHR 2012 Signature Verification Competition	Jun 2012	Archived
ICFHR 2010 Signature Verification Competition	Jun 2012	Archived
ICDAR 2011 Signature Verification Competition	Jan 2012	Archived
ICDAR 2009 Signature Verification Competition	Jan 2012	Archived
CROHME: Online Handwritten Mathematical Expressions	Oct 2012	Archived
HIT-OR3C	Apr 2012	Archived
CASIA Online and Offline Chinese Handwriting Databases	Mar 2011	Linked
The GERMANA Dataset	Feb 2011	Linked
The RODRIGO Dataset	Feb 2011	Linked
Devanagari Character Dataset	Nov 2010	Archived

[IAM Online Document Database (IAMonDo-database)](#)	Jun 2010	Archived
[IAM On-Line Handwriting Database](#)	Mar 2010	Linked
[IBN SINA: Arabic manuscripts images](#)	May 2010	Archived
[UNIPEN database](#)	Aug 2009	Linked
[Nakagawa Lab Online Handwriting Database](#)	Aug 2009	Linked
[The Informal Competition of Recognizing On-line Words (ICROW)](#)	Aug 2009	Linked
[CEDAR Off-line Handwriting CDROM1](#)	Aug 2009	Linked
[IAM Database](#)	Aug 2009	Linked
[MARG- Medical Article Records Groundtruth](#)	Aug 2009	Linked
[Hindi font samples](#)	Aug 2009	Linked
Software and Tools		
[Europeana API](#)	July 2014	Linked
[Tools from the IMPACT Centre of Competence](#)	July 2014	Linked
[PixLabeler](#)	Jun 2012	Linked
[OCRopus(tm)](#)	Jun 2012	Linked
[The Hidden Markov Model Toolkit (HTK)](#)	Jun 2012	Linked
[Bidirectional Long-Short Term Memory Networks](#)	Jun 2012	Linked
[SRILM - The SRI Language Modeling Toolkit](#)	Jun 2012	Linked
[Torch 5](#)	Jun 2012	Linked
[PRTools](#)	Jun 2012	Linked
[GEDI: Groundtruthing Environment for Document Images](#)	Feb 2011	Linked
Ground Truths		
Ground Truth for tables in dataset UNLV	Jun 2014	Archived
Ground Truth for tables in dataset UNLV	Jun 2014	Archived

POLICIES AND DATASET SOURCING ACTIVITIES

One of the priorities defined at the start of our term was to maintain an active attitude in soliciting datasets and increase the visibility of the TC-11 Web site as the prime place to host datasets and other resources relevant to the field. One way to increase visibility has been to announce new material archived through the TC-11 newsletter, giving thus further incentives for authors to submit resources to the TC-11.

On the other hand, we actively invite authors who present new datasets or other relevant material at TC-11 conferences to provide such materials to TC-11 for archiving. This seems to work, by creating good responses especially after TC-11 conferences. As an indication, following this practice over the past years we have archived on the TC-11 site relevant material originally published in the conferences listed below. It can be appreciated that while only TC-11 events were covered until 2009, over the past years the reach of TC-11 has expanded over and above our own events, sourcing relevant resources to the field from an increasing number of leading conferences.

2.2 RESEARCH INITIATIVES

2.2.1 EVENTS ORGANISED

CONFERENCES AND WORKSHOPS DURING THE REPORTING PERIOD

During the period covered by the report, the following events were organized by TC11 or are planned to take place in the near future. All events are active as shown in the statistics of the number of presented papers as well as participants.

Event	Dates	Venue	Stats & URL
DAS 2016	April 11-14, 2016	Santorini, Greece	# submitted papers: 162 # accepted papers: 78 (32 oral, 46 poster) # participants: 126 http://www.primaresearch.org/das2016/
ICDAR2015	August 23-26, 2015	Nancy, France	# submitted papers: 401 # accepted papers: 230 (89 oral, 141 poster)

			http://2015.icdar.org/
ICFHR2014	September 18-20, 2012	Bari, Italy	# submitted papers: 158 # accepted papers: 132 # participants: over 150 http://www.icfhr2012.uniba.it/
DAS 2014	April 7-10, 2014	Tours, Loire Valley, France	# submitted papers: 138 # accepted papers: 73 (27 oral, 46 poster) # participants: 145 http://das2014.sciencesconf.org/

In addition to the above key events, TC members are also involved in the organization of several other events, some of which are endorsed by IAPR.

Event	Dates	Venue	URL, etc.
IWRR 2016	Oct. 9, 2016	Amsterdam, The Netherlands	http://www.cvc.uab.es/iwrr2016 in conjunction with ECCV 2016
MOCR2015	August 22, 2015	Nancy, France	http://www.cubs.buffalo.edu/MOCR2015/ in conjunction with ICDAR2015
HIP2015	August 22, 2015	Nancy, France	http://hip2015.irisa.fr/ in conjunction with ICDAR2015
CBDAR2015	August 22 2015	Nancy, France	http://www.cvc.uab.es/cbdar2015/ in conjunction with ICDAR2015
AFHA2015	August 22, 2015	Nancy, France	http://www.dfki.uni-kl.de/afha2015/index.html in conjunction with ICDAR 2015
IWRR 2014	Nov. 2, 2014	Singapore	http://imlab.jp/iwrr2014/ in conjunction with ACCV 2014

3RD INT. DOCUMENT IMAGE PROCESSING SCHOOL

Apart from conferences and workshops, TC11 has endorsed the organisation of the 3rd Int. School on Document Image Processing, which took place in Kefalonia, Greece, in 24-27 June 2015. It was attended by seven students, and comprised 10 two-hour lectures, four case study presentations, and a poster session. Student feedback has been overly positive, with suggestions for including hands-on sessions in possible future editions. The Web site of the event is: http://samosweb.aegean.gr/idips2015/

1ST TC10/TC11 SUMMER SCHOOL ON DOCUMENT ANALYSIS: DOCUMENT INFORMATICS

In an effort to create an umbrella around the TC11 educational activities, and to create the mechanisms to ensure sustained quality of the activities and equal opportunities for participation by the whole TC11 membership, the TC11 leadership committee decided to put forth a call for organizing a biennial summer school on document analysis. We coordinated with TC10 in order to unify efforts in this sense, and prepared guidelines for organizing and bidding to host the TC10/TC11 Summer School which can be found on the TC11 Web site[1].

A Summer School evaluation board was set up to evaluate submitted bids, with the participation of 6 ex-officio members (TC10 and TC11 chairs, vice-chairs and education officers) and two external members. The intention is for the committee to evolve into a 3-member Steering Committee as explained in the guidelines after the first edition of the summer school takes place. For evaluating proposals for the 2016 call, the Summer School evaluation board was composed by:

- Gernot Fink (TC11 educational officer, Europe)

- Alicia Fornes (TC10 educational officer, Europe)

- Koichi Kise (TC11 Chair, Asia)

- Rafael Lins (TC10 Chair, America)

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[1]

http://www.iapr-tc11.org/mediawiki/index.php/Guidelines_for_Organising_and_Bidding_to_Host_the_TC10_/_TC11_Summer_School

- Dimosthenis Karatzas (TC11 Vice-chair, Europe)

- Bart Lamiroy (TC10 Vice-chair, Europe)

- Cheng-Lin Liu (IAPR Educational Committee, Asia)

- Srirangaraj Setlur (IAPR Conferences and Meetings Committee, America)

The call for receiving biddings was published in the May 2015 newsletters of TC10 and TC11, with a deadline set for August 2015, later extended to October 2015. Two bids were received, out of which one was withdrawn shortly after. The one remaining bid was evaluated and finally endorsed by TC10 and TC11 after two rounds of improvements. The details of the accepted activity are as follows.

Dates: Jan 23 to Jan 28, 2017

Location: Jaipur, India

Web: http://cvit.iiit.ac.in/SSDA/

Organizers: Santanu Chaudhuri (CEERI/IITD), Venu Govindaraju (SUNY Buffalo), C. V. Jawajhar (IIIT Hyderabad)

3RD ICDAR DOCTORAL CONSORTIUM

TC11, in collaboration with TC10, organized once more the ICDAR Doctoral Consortium, in the context of the 2015 edition of the conference.

The ICDAR Doctoral Consortium is considered a core activity of the ICDAR conference series. The goal of the Doctoral Consortium is to create an opportunity for Ph.D. students to test their research ideas, present their current progress and future plans, and receive constructive criticism and insights related to their future work and career perspectives. A mentor (a senior researcher who is active in the field) is assigned to each student to provide individual feedback. In addition, students have the opportunity to present an overview of their research plan during a special poster session.

Through an open call for participation, 18 Ph.D. students registered for the third edition of the ICDAR Doctoral Consortium.   For every PhD student a dedicated mentor was assigned who were called upon among mentors from previous DCs and senior members of the research

community. There were no registration fees for the Ph.D. students or their assigned mentors. The event took place the day before the main ICDAR conference, on the afternoon of Sunday, Aug. 23. The schedule was as follows:

1:30 pm – 2:00 pm: Welcome and short talk: "A Traveller's Guide to the PhD" (see: http://patrec.cs.tu-dortmund.de/pubs/papers/Fink2015-ATG.pdf)

2:00 pm – 3:00 pm: Brief oral introductions to student research plans (poster teasers)

3:00 pm – 3:20 pm: Coffee break

3:20 pm – 5:00 pm: Student poster session with discussion and feedback

Further details regarding the 2015 ICDAR Doctoral Consortium can be found on the conference website: http://2015.icdar.org/doctoral-consortium/

2.2.2 PUBLICITY / DISSEMINATION ACTIVITIES

Over the past years, we continued to employ two types of communication: our Web site and a monthly email newsletter.

The TC11 newsletter, which is published every month, distributes the following information to its readership:

- regular content:
  - overview of most important conference-related dates (especially paper submission deadlines)
  - overview of new and recently published Datasets (introduced 10/2012), which is intended to increase the general awareness of publicly available datasets and to promote their use for benchmarking in future research efforts and related publications
- on-demand content:
  - new/updated calls-for-papers for TC-11 related conferences and workshops as well as journal special issues and books
  - detailed announcements of new datasets available via the TC-11 website (in addition to the new overview section on "New and Recently Published Datasets")
  - job opportunities
  - event reports (conferences, workshops)

The TC-11 Web site provides visitors an up-to-date calendar of upcoming and past events of TC11 interests, newsletter archives, and related datasets. With the support of IAPR we have created a Web portal that facilitates the collection and archiving of new resources (see section 2.1.6)

Past newsletters are archived online on our website: http://www.iapr-tc11.org/mediawiki/index.php/Newsletter_Archive.

3   PLANS (TIMELINE UNTIL ICPR 2016 AND BEYOND)

We have the following plan for the period 2015-2016.

3.1.1   SOCIAL MEDIA

In addition to the monthly newsletter, we will investigate the option of using social media such as twitter and LinkedIn for supporting TC11 members. The introduction of an assistant from the TC11 community would be planned to support the management of such platforms.

3.1.2   IMPROVING THE QUALITY OF THE ICDAR CONFERENCE

The ICDAR 2017 organizing team in close cooperation with the ICDAR advisory board is currently debating a number of changes for making ICDAR, our main conference series, more attractive to the research community. This follows a line of continuous improvements that we have started implementing since 2013.

In ICDAR2013, we introduced the "rebuttal process" to make the reviewing process more reasonable and transparent to authors. In ICDAR2015, we introduced "area chairs" to evaluate reviews and rebuttals at a higher detail. We expect that with a reasonable control of the acceptance rate along with the above new trials, the conference will be more attractive and meaningful for many researchers.

4   RECOMMENDATION TO EXCO FOR TC LEADERSHIP TEAM FOR 2016-2018 TERM

The recommendation for the period 2016-18 is that the current vice-chair, Dr Dimosthenis Karatzas, assumes the role of the chair. The exact composition of the new leadership team

should be decided by the new chair when appointed. A number of observations made by the current leadership team, that might be helpful in this process, are listed below.

Most of the members of the current leadership team have been serving in their posts for 4 terms already. It is therefore recommended that there is a healthy amount of renewal, with the aim to involve new members of the community in leadership roles.

Historically, the TC11 chair and vice-chair come from different continents in order to respect the wide geographic distribution of the TC11 membership. The composition of the leadership team, to the extent possible, should reflect the same principle. It is highly recommended that appropriate effort is taken to preserve the above principle in the composition of the new leadership team.

In terms of roles, during the current term we have identified the need to place more emphasis on communication, over and above the email-based newsletter, ensuring some presence in social media. At the same time, educational activities are becoming quite important and demanding, and might require more dedication. It is recommended that these findings are taken into account when constituting the new leadership team.