

GLOBAL Communications NEWSLETTER

August 2013

ComSoc – A Retrospective on this Century (Part 2): Growing the Society

By Celia Desmond, Past ComSoc President

(with thanks to Curtis Siller and Nim Cheung for their comments)

Chance comments recently prompted me to reflect on ComSoc accomplishments over recent years. Consequently, I thought it would be interesting to review some pertinent published material reflecting on contributions of the six most recent Past Presidents, beginning with 2000, and running through to the end of the term of Byeong Gi Lee in 2011. Finding this material was actually easy, as the ComSoc Presidents have traditionally published a column each month in IEEE Communications Magazine. Generally, these columns were co-authored with the Vice Presidents, Directors, Committee Chairs and other contributors, providing an opportunity to share and highlight their accomplishments.

This article, the second of three, focuses on the many achievements during the years 2004-2007. I hope that this brief survey will illustrate how the significant work that our lead members – not only the Presidents, but their full boards and related committees – have improved the Society over recent years. In most cases the Past Presidents continued to serve both ComSoc and IEEE, even today. Short notes showing some of their continuing contributions follow the names of the Past Presidents.

Through these we can see some continuing trends. One of these is the continued globalization of ComSoc. In fact, since before 2000, we have always had BOG representatives from around the world, some elected and some via appointments.

We credit the exceptionally congenial work atmosphere that existed among our Board members as one of the key factors responsible for these very successful years. A second key component is the dedicated and ongoing loyal support provided by IEEE staff. Countless times we would have been lost without the experienced advice of their leader, Executive Director Jack Howell.

Let's look at these accomplishments.

Curtis Siller (2004 – 2005)

(Curtis continues to support ComSoc in various positions. As Director of the ComSoc Standards Board, he stimulated many standards projects, while nurturing to fruition others that were already underway. He also served as a Division III Director. He is currently a member of IEEE Publications Services and Products Board, and six other IEEE boards and committees.)



Curtis Siller



Nim Cheung

- Extended topics for our publications to include areas new at that time, such as home networks and sensors.

- Continued to sponsor over 50 international conferences.

- Initiated workshops that would position the Society to commence development of new standards.

- Introduced a Chapter incentive program to grow global Chapter activities.

- Facilitated transition of publications from paper to electronic – an activity spanning 10 years – beginning when

he was Editor-in-Chief of *IEEE Communications Magazine* (1993 – 1994).

- Championed a controversial approach to pre-production of journal pages (now widely embraced) that reduced overall internal per-page production charges by a factor of ten.

- Created an active Industry Advisory Board.

- Oversaw the gradual integration of select IT support (servers) with IEEE Operations.

- Enhanced ComSoc's IT infrastructure with personalized features in ComSoc's digital library, hence enhancing online tutorials and e-publications.

- Increased the Society's focus on marketing.

- Continued Distinguished Lecturer Tours and Student Travel Grants, despite a tight money situation, and maintaining a balanced budget.

- Elevated standards to a Standing Committee of our BOG, and created the positions of Director of Standards while work was already underway on multiple, significant standards.

- Ensured that Global Communications Newsletter (GCN) had correspondents from more than 20 countries.

- Oversaw the initial use of electronic technology for voting for BOG members.

- Created three new conferences.

Nim Cheung (2006 – 2007)

(Nim continued in positions in different ComSoc committees and Editor-in-Chief of the *IEEE Communications Magazine*. He has also served in many IEEE committees as well as IEEE Division III Director and Chair of the IEEE Fellow Committee.)

- 53% of ComSoc Chapters were now outside US; membership in US at 51%.

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2013 Alexander Graham Bell Memorial Lecture by Vijay K. Bhargava in Hyderabad

By Deergha Rao Korrai, Member, IEEE ComSoc/Signal Processing Joint Chapter of Hyderabad, India

The Communications and Signal Processing societies Joint Chapter of IEEE Hyderabad section have organizing A.G. Bell memorial lectures since 2011, and the chapter wishes these lectures to be delivered by distinguished scientists on the birthday of Alexander Graham Bell, i.e. March 3 of every year, in the broad areas of Communications and Signal Processing.

Dr. Vijay K Bhargava, Professor, IEEE Fellow, Dept. of ECE, University of British Columbia, Canada, and present president of the IEEE Communications Society, delivered the 2013 memorial lecture on 'Research Issues for Energy Efficient Cellular Networks' at the G. P. Birla Centre, Adarsha Nagar, Hyderabad on 2 March 2013 from 3.45 pm to 5 pm.

The IEEE Signal Processing Society funded this memorial lecture. The audience for this lecture, 50 attendees in total, included students, research scholars, participants from industry, and faculty from universities and colleges.

Dr. Vijay K Bhargava started his lecture by saying that the rising energy costs and carbon footprint of operating cellular networks have led to a trend in addressing energy-efficiency among the network operators and regulatory bodies such as 3GPP and ITU. "Greening" the wireless networks is a vast research discipline that needs to cover all the layers of the protocol stack and various system architectures, and it is important to identify the fundamental trade-offs linked with energy efficiency and the overall performance.

In his talk, he focused on the following four important aspects of a green networking:

- Defining green metrics.
- Energy saving in base stations.
- Network planning.
- Efficient system design.

In a brief discussion on energy efficiency metrics, he mentioned that metrics can be defined either by the ratio of output and input power or by the ratio of some measurable performance to the input energy (e.g. bits/Joule). Also, he pointed out that defining metrics at the component level is easy. While it is more challenging to define metrics at a system or network level due to the variety of network types and objectives, defining one single metric is doubtful. To assess



Dr. Vijay K Bhargava delivering the lecture.

true "Greenness" metrics, it is necessary to also consider deployment costs, QoS requirements, and spectral efficiency.

Since Base Stations (BSs) consume a major chunk of input energy, he discussed the energy efficiency of BSs and mentioned the following methods for energy saving:

- PAs based on digital pre-distorted Doherty-architectures, GaN (Aluminum Gallium nitride) and switch-mode seem to be more promising.
- An LTE standard that introduces power saving protocols for the mobile handset: Discontinuous Reception (DRX) mode and Discontinuous Transmission (DTX) mode.
- Switching off BSs under low load and allowing other BSs to take care of remaining users could save energy.
- Cell zooming concept through which BSs can adjust the cell size according to traffic situation.
- Reducing the number of BSs.

Next he discussed energy efficiency from a network planning perspective, based on smaller cells for heterogeneous networks. He stated that an obvious way to increase power efficiency is to decrease the propagation distance between nodes. Cellular network deployment solutions based on smaller cells such as micro, pico, and femto-cells are very promising to save energy. However, optimal deployment strategies are needed since deploying too many cells may reduce overall efficiency of macrocell BSs. Further, he stated that deployment of a large number of low power nodes (micro, pico, femto) among high power macro nodes introduces severe interference problems, and hence it is important to develop smart power allocation schemes for interference mitigation and power efficiency. He ended the lecture with a discussion of heterogeneous networks, stating that they have proposed a multi-objective optimization scheme to achieve optimal power allocation in heterogeneous networks where they jointly minimize the total power consumption at the transmitter and maximum allowed outage probability at the receiver.

For efficient system design, he put special emphasis on cognitive and cooperative techniques in order to realize energy efficient cellular systems. He mentioned that more expensive and complex techniques have been proposed in the literature to reduce energy consumption via Cognitive Radio. He stressed the need for more feasible solutions in the future. Cooperative communications extend the coverage by avoiding large power losses in long distances and eliminating the shad-

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Dr. Deergha Rao Korrai (first from left), immediate past chapter chair, Dr. Vijay K Bhargava (second from right), Dr. V. U. Reddy (first from right), IEEE Life Fellow, memorial lecture sub-committee chair, Dr V. P. Kodali, IEEE Fellow, after the lecture at the G. P. Birla auditorium.

Snowchange: Spanish-Portuguese Collaboration for Hyper-spectral Remote Sensing of Permafrost in Antarctica

By Julio Martín-Herrero, Pedro Pina, Carla Mora, Gonçalo Vieira, Spain and Portugal

Snowchange (Snowpatch dynamics and the changing permafrost environment) is one of seven projects conducted by the Portuguese Polar Program (Propolar [1]) during the last season in Antarctica. In the words of Prof. Gonçalo Vieira (Technical University of Lisbon), principal investigator and Propolar Managing Director, the project “focuses on the permanently frozen soil (permafrost) and how it reacts to climatic alterations. In Snowchange we study the snow, a determining factor for permafrost and its relationship with local climates and microclimates, and also with vegetation. Interactions among these variables are essential for the ecosystem dynamics of the areas of Antarctica without permanent ice cover.” Snowchange concentrates on the dynamics of snowfields (permanent accumulations of snow and ice, also known as névés) and the soil and vegetation (lichens and moss) patterns around them that serve as telltales of their long-term evolution. The Antarctic Peninsula has experienced one of the highest rates of warming on Earth, with a rise of 2.5°C in their annual average temperatures in the last decade. As a result, permafrost areas in the Peninsula are approaching a critical threshold, with consequences on the hydrology and the terrestrial ecosystems of the summer ice-free areas, where most of the life in the Antarctic continent is concentrated. Snowfields prevent ground warming in summer and are therefore very important for the preservation of permafrost. A better understanding of the dynamics and evolution of snowfields is essential for a better understanding and modeling of permafrost. Moreover, snowfields also act as traps for sediments and nutrients transported by the wind, which they slowly release during snow melt in summer.

Besides geomorphology and sedimentology field work, the project aims at creating detailed high resolution cartography of the snowfields, and soil types and structures and vegetation types and patterns around them. For this purpose, QuickBird, Envisat and TerraSAR-X remote sensing images will be used, in combination with data from an ultralight hyperspectral system developed at the AtlantTIC Research Centre [2] (University of Vigo, Spain). System integrators from AtlantTIC have developed an airborne pushbroom hyperspectral system specifically designed to be flown on board ultralight aircraft, which they usually fly on board an open two-seater gyrocopter. Ultralight or light-sport aircraft offers many operational advantages for high-resolution airborne imaging, such as low acquisition, operational, and maintenance costs, high flexibility, good availability, low speed, and low altitude. The 200 VNIR spectral bands and 1280-pixel width of the system provide high resolution (both spectral and spatial) imaging which allows highly detailed mapping of soil types and vegetation cover. Normally, hyperspectral imaging is restricted to large-budget projects involving expensive aircraft and equipment, with high operational costs and complexity. In fact, it was only in March 2011 that the first hyperspectral imaging campaign was carried on in Antarctica by the British Antarctic Survey, providing large scale cartography of several areas of the Antarctic Peninsula. The system from AtlantTIC is the second hyperspectral system to be deployed in Antarctica, but with a more localized and purposeful intention.

In the Antarctic summer 2011-12 researchers from Propo-



A shelter station in Fildes Peninsula, King George Island (Antarctica).

lar and AtlantTIC in collaboration with INACH (Chilean Antarctic Institute) stayed at “Julio Escudero” Antarctic Research Station in Fildes Peninsula (King George Island), performing field work on several snowfields in the Peninsula and waiting for a window of opportunity to fly the hyperspectral system on board a helicopter from the Chilean Navy icebreaker “Viel”. Meteorological conditions in the Maritime Antarctica are very challenging for low altitude airborne optical remote sensing, with strong winds, low temperatures and frequent and rapidly changing cloud cover, and Antarctic aircraft logistics are rather complex and difficult to schedule. After three weeks of field work with no conjunction of helicopter availability and good weather conditions, the researchers decided to take advantage of the light characteristics of the hyperspectral system to dismount it from the gyro-stabilized gimbal for airborne operation and carry it to some hilltops for a series of manual scans of the terrain. “The wind blew very strong and cold on top of the hills, so it was very hard work: steady scanning was just physically impossible,” says Julio Martín-Herrero, developer and operator of the system. “However, the purpose of the scans was not geometric accuracy, but a radiometric assessment of the potential of the hyperspectral images for the task at hand.”

The promising radiometric values obtained in the campaign were shown in the Workshop Propolar Antarctic Campaign 2011-12: Outcome, First Results & Perspectives, held in Lisbon in June 2012. Propolar has renewed interest in continuing the collaboration with AtlantTIC for another attempt, this time with infrastructure from the Korean polar program (KOPRI), which has also shown interest in the hyperspectral images. The potential of the hyperspectral data has also attracted the Italian polar program, interested in flying the system over Victoria Land (East Antarctica). “Combining such scarce flight opportunities with suitable meteorological conditions and aircraft availability (constantly required for all kind of logistic operations and emergencies) is the main obstacle,” says the researcher. “Our aim is to become independent of such scarce availability, and this requires either having our own ultralight aircraft on the terrain, such as a gyrocopter, or developing a new hyperspectral system, even smaller, suitable for unmanned aircraft (UAV), a compact but robust airplane that we may fly every time the weather conditions allow it.” AtlantTIC has already launched a line of work for the development of a hyperspectral system specially adapted to the polar environment and restrictions, both in the Antarctic and the Arctic, in collaboration with Propolar, Prof. Nuria González, Director of AtlantTIC, confirms: “We also have a running collaboration with Prof. Christian Germain

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IEEE ComSoc Montreal Chapter Won The 2012 Chapter of Year Award

By Anader Benyamin-Seeyar and Dr. Manijeh Khataie, Montreal ComSoc Chapter, Canada

IEEE Montreal's communication Chapter was led actively by Dr. Vijay Bhargava within 1976 to 1977 with the objective of bringing many technical lectures, tutorials and short courses to Montreal's IEEE COMSOC's membership and other interested communication professionals. Since then, chapter has been very active with many other dedicated engineers such as: Dr. Ahmed K. El-Hakeem, ..., Dr. Reza Soleyman, Dr. Walaa Hamouda, Dr. Anader Benyamin-Seeyar. This chapter is a joined chapter with Information Theory Society. Each year the chapter has been hosting many interesting presentations, mini-conferences and workshops. These programs have greatly benefited members by offering different events such as; Distinguished Lecture Program (DLP), Distinguished Lecture Tour (DLT), supporting major conferences locally and / or with neighboring Sections and joint chapter activities.

IEEE Montreal Section has around 2200 members which is a 12% of all membership within Canada. Montreal Section has 21 Chapters (covers almost 36 technical societies), 3 affinity groups (GOLD, WIE, Life Members) and 1 Pre-University based Teachers In Service Program (TISP) team. Close to 23% of IEEE members in Montreal are member of COM-SOC and it is gradually increasing by encouraging the new graduates and industrial members to join our chapter as we organize seminars, workshops and DLP talks for academia and industrial members.

Last year, IEEE Montreal's Communications Chapter was awarded with a highly prestigious of the "IEEE ComSoc's Chapter of the Year 2012 Award"! This is a remarkable achievement that has made us very proud of our volunteer's dedication and executive members of the Chapter. Dr. Benyamin-Seeyar, Montreal Chapter chair attended to GLOBCOM at Anaheim California to receive the "Chapter of the Year" Award. At the traditional Luncheon Award ceremony for year 2012, began on December 4th, Tuesday afternoon with Awards ceremony Chair, Dr. Andreas Molich, who welcomed all the participants at the conference. At this ceremony, IEEE Montreal Chapter was awarded with the Chapter Achievement Plaque for the Best Communication Chapter for North America, and



Awards Ceremony, left to right Dr. Andreas Molich, Dr. Anader Benyamin-Seeyar, Dr. Vijay Bhargava, Dr. Nelson Fonseca, Vice President of ComSoc Member Relations.

then, another prestigious Award as the Chapter of the Year 2012. Anader was called twice to the podium for these precious Awards. There are a few memorable pictures taken at this luncheon ceremony that are part of this report. Dr. Manijeh Khataie, Chapter's Membership Development officer, also attended the North America Regional Chapter Chairs Congress (NA RCCC) and she made a presentation on major Montreal Chapter's activities. ComSoc NA Region Chapter Chair Congress (NA RCCC) gathering was held during December 6-7, 2012 in Anaheim, California in conjunction with GLOBECOM 2012. The objective of NA RCCC gathering was to improve global chapter activities through sharing experiences of all chapters gathered together annually. This NA RCCC event gave us the opportunities to meet with the other chapter chairs and got many good ideas to improve our activities and also to get familiar more with the IEEE COMSOC programs and supports. This year's NA RCCC gathering will be a memorable for Montreal Chapter for many years to come.



Dr. Khataie is presenting Montreal Chapter's activities at the NA RCCC event.



Dr. Benyamin Seeyar, IEEE Montreal's COMSOC Chapter Chair thanking IEEE COMSOC during Luncheon Award.

Obtaining such Awards was results of multiple factors that have led us to these successful rewards. As Chair of this Chapter, Dr. Benyamin-Seeyar, has devoted his entire career, since year 1973, in various Communications fields, academic and industrial. Throughout of his career he has been gaining tremendous knowledge from IEEE offerings and since year 2000 has come to the point of giving back to his society through participating in the IEEE Standards, making programs and also service offering to the IEEE community. He was the chair of IEEE Montreal section for two consecutive years. Since 2009 he became the chap-

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MONTREAL CHAPTER/continued from page 4

ter chair of IEEE COMSOC and since then Montreal Chapter has gone through few major changes and has launched many interesting programs by implementing the following process:

a) The first step was to build a dedicated and knowledgeable Chapter team. The COMSOC Montreal executive committee members are as follow:

- Anader Benyamin-Seeyar, IEEE Canada Montreal's Communications, Chapter Chair.
- Reza Soleymani, Communications, Chapter Vice-Chair.
- Manijeh Khataie, Chapter Membership Development (MD).
- Kaveh Moezzi, Chapter Treasurer.
- Jawwad Jamshid, Chapter Secretary.

b) The chapter built close ties and collaborate with other Local and Regional Chapters to share the talks between closely related Chapters such as: IEEE Montreal's Broadcast Technologies (BTS) Chapter, Control Systems Chapter, Aerospace Chapter, Microwave Theory and Technical (MTT) Chapter and Vehicular Technology Society (VTC) Chapter

c) Organized interesting Distinguished Lecturer Tours DLT tours between Eastern Canada and Toronto areas. One of the successful DLT was a tour in Easter Canada and Toronto area by Prof. Fabrizio Granelli, University of Trento, Italy. This program was done from June 4th to June 15th, 2012 within Montreal, Ottawa, Kingston, Quebec city, Toronto, Halifax St. John's and Fredericton. The titles of these talks were "Networking and the Smart Grid" and "Green Wireless Communications".

d) Shared Distinguished Speakers with our Sister Sections in USA (Boston and Main) and within Center and Easter Canada. Example Fly By Wireless (FBW) workshop, which was a joint workshop held in 2010 in Main, 2009 and 2011 in Montreal and 2012 in Ottawa.

e) Organized mini-conferences and workshops between Communications Chapter, BTS, AeroSpace, Control Systems, VTC,... For example a Mini-Conference between Communication and Control Societies has been organized since 2010. The objective is to have graduate students rehearse the presentation of their papers for international conferences such as GlobeCom. Each year the chapter invites a few speakers as a model for students. The other example of these activities is a joint workshops & presentation with Aerospace in June 2011, which 75 International participants attended at this workshop.

f) To encourage members for participating and organizing Conference. For instance Dr. Benyamin-Seeyar is a member of organization committee of IEEE International Conference on Wireless for Space and Extreme Environments (WiSEE), Baltimore, MD, November 7 – 9, 2013.

g) Brought many well-known distinguished speakers to interested Chapter members, such as:

- Dr. David Falconer, Carleton University, Ottawa, Canada.
- Dr. Tad Matsumoto, School of Information Science, Japan.
- Dr. Vijay Bhargava, University of British Columbia, Canada.
- Dr. Mehdi Alasti, Sprint Nextel WiMAX Core Tech., Washington DC, USA.
- Dr. Bhumip Khasnabish Verizon Networks & Technology, Waltham, USA.
- Dr. Victor Leung, University of British Columbia, Canada.
- Dr. Michael Devetsikiotis, North Carolina State University, USA.
- Dr. Fabrizio Granelli, University of Toronto, Canada.
- Dr. Mary Ann Ingram, Georgia Tech, USA.
- Dr. Shahrokh Valaee, University of Toronto, Canada.
- Dr. Jacob Gavan, Holon Academic Institute of Technology, Israel.
- Dr. Steve Buch, Researcher at GE Global, Niskayuna, NY, USA.
- Dr. Amir Khandani, University of Waterloo, Canada.
- Dr. Michaela Van Der Schaar, Chancellor's Professor, UCLA, USA.
- Dr. Arun K. Somni, Iowa State University, USA.
- Dr. Masoud Olfat, director of RAN technology & standard in Light Squared, USA.

h) Chapter's support of students branches and other affinity groups such as WIE, and actively participate in the interest group TISP.

i) Benefitted from inviting well-known Professors coming from various parts of the world, to give a talk for our membership crowd, while participating at local conferences or being an external thesis defense examiners, ...

j) Benefitting from connections and facilities of Concordia University, McGill University and École Technologies Superior (ETS), and École PolyTechnique de Montréal for our organized talks.

In all above mentioned activities, we are thankful to our North America leader, Dr. Yigang Cai who has been instrumental to help and encourage all of our Eastern region Chapters to benefit from his support for selecting and approving DLT tours between our regions. Many thanks for his great help and support throughout this journey. Also our thanks will extend to Dr. Wahab Almuhtadi, the Chair of IEEE Canada Eastern Area for his cooperation and support and also technical COM-SOC Staff for their great support for running effective chapter activities especially Carol Cronin and Carole Swaim.

We never forget and always appreciate the continues support of Montreal educational institutions, especially Concordia University which have been, and continue to be, an excellent friend of IEEE, providing Seminar salons free of charge for a large number of conference attendees.

COMSOC RETROSPECTIVE/continued from page 1

• ComSoc Presidents have traditionally shared the President's Page in Communications Magazine with their VPs. Nim shared one of his columns with the IEEE President and another with the IEEE VP Standards, strengthening our relations with the parent organization.

• Championed the following three initiatives sponsored by IEEE New Initiatives Committee (NIC):

• IEEE Wireless Communication Engineering Technologies (WCET) certification program which engaged hundreds of volunteers and industry executives. This product remained the most successful product line introduced in ComSoc in many years.

• IEEE Applications & Practice, an *IEEE Communications Magazine* supplement catered to engineering practitioners, published jointly with five other IEEE Societies.

• Industry-sponsored webinars that were well attended and served as a model for other IEEE units.

• Achieved record success in ComSoc's major conferences as measured by attendance, relevance of program, conference surplus, and industry participation. Sponsored IEEE's first CEO Forum in ICC 2007 on "The Future of Convergence".

• Significantly expanded ComSoc's activities in China and India, the two countries with largest number of young information and communications technology professionals.

• Initiated ComSoc's flagship IEEE ICC 2008 conference in Beijing (the first in China).

• Staged two India Roadshows by ComSoc officers and launched the IndustryNow TM program with three Indian companies.

• Standardized procedures for ensuring success of our major conferences, facilitating the running of these conferences.

- Instituted poster and demo sessions at conferences.
- Made web based tutorials available.
- Revenue from electronic periodicals increased significantly.
- Introduced an on-line magazine for practitioners.
- Technology Leaders Forum in *IEEE Communications*

Magazine published directional messages from industry leaders.

- Launched a new electronic Transactions.
- Launched Chinese language ComSoc website.
- Chapters now at 181, with 14 new Chapters added.
- Created a Piazza on web for Sister Society members to meet each other.
- Expanded activity in China and India, with strong support from the IEEE Asia office.
- Held four Regional Chapter Chairs conferences to motivate Chapters around the world.

MEMORIAL LECTURE/continued from page 2

owing effect. Also, it has been shown in literature that relaying techniques can result in extended battery life.

Finally, he discussed the following broader perspectives and possible future trends in realizing a green cellular network technology:

- A database in BS and mobile terminals, in which the traffic pattern during different times of the day is saved.
- Based on the obtained statistics, dynamic algorithms can be designed to switch the BS or mobile terminal to a different power profile appropriate for that time of the day.
- Absorbing BSs in a smart grid can exceedingly increase the power efficiency without adversely affecting the QoS and capacity.
- Measurement sensors can update the status of BSs, and then transmit the status to the smart grid control system, thereby improving energy efficiency.

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from University of Bordeaux (France) for the development of imaging systems for small autonomous land vehicles for environmental work, with very tight power, weight, and size restrictions. Many synergies naturally arise in the international effort to better understand the world around us."

References

- [1] <http://www.propolar.org>
- [2] <http://atlantic.uvigo.es>

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