

Miruna Amza
& Iris Opris
A wild
and fertile
ground

spokes

- spokes**, noun, plural of spoke
1. One of the rods or braces connecting the hub and rim of a wheel.
 2. *Nautical* One of the handles projecting from the rim of a ship's steering wheel.



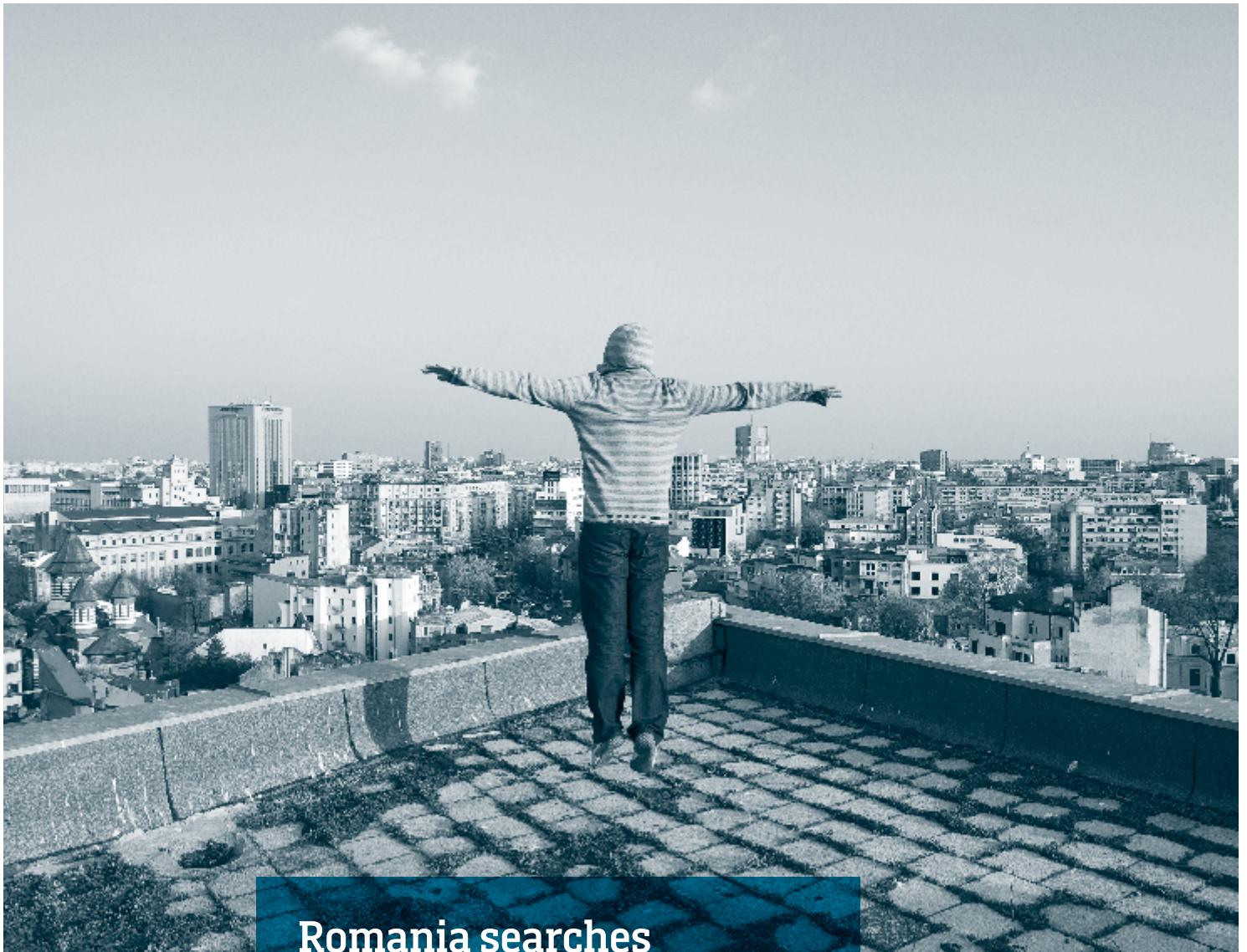


photo by Stefan Tuchila

**Romania searches
for footing in public science
engagement**

Overlooking Bucharest, Romania.

A wild and fertile ground

MIRUNA AMZA & IRIS OPRIS

ACTIVI PENTRU VIITOR AND THE STEAM INITIATIVE,
BUCHAREST, ROMANIA



Science in Romanian society is like the theatre: Scientists perform on stage while citizens take on the role of passive spectator to the changes unfolding before them. Living in politically and economically turbulent times, we may question ourselves if this is the right place or momentum to push things forward. Do we have what it takes? Can we make it through?

Poverty-driven innovation

Once upon a time, one of the things Romanians used to love and praise was their science education. In the days of the Communist regime the push to industrialization was strongly reinforced by the study of mathematics, physics, or chemistry. In return, graduates were promised respectable, secure jobs. Our students became world class and this was a subject of national pride. Industries and research gathered into clusters, sustaining various branches of the scientific effort. Certainly, everybody was focused on doing their jobs according to the directives of the Party, but this didn't preclude passion and dedication. There was more to it than nine to five jobs.

Some of these people would go home and continue to research, innovate or invent on their own. Were they so lucky as to not fall under the vigilant eyes of the Securitate – the secret police – their projects would do just fine. But the centralized planning of the industry according to the dictator's personal whims eventually crippled the economy and made Romania one of the poorest countries behind the Iron Curtain. The lack of resources and the widespread censorship paralyzed scientific research, but it spurred a wave of poverty-driven innovation; hence, the popular saying that Romanians can solve any problem with a piece of wire.

How do we halt the brain drain?

As the borders opened following the fall of Communism, Romanian perspectives suddenly changed, as their world became wider and full of possibilities. Emigration has been a recurring theme ever since, particularly for high school and college students.

Talented students still perform excellently in international competitions of astronomy, math, physics and informatics. World class universities and global corporations such as Google, Microsoft, Amazon or Oracle regularly recruit Romanians. Everywhere you look, there's at least one capable Romanian working very far from home.

Back home, Romanian research is not exactly known to be thriving which is not surprising given the minuscule funding allocated by the government. Cross-disciplinarity is almost non-existent; few scientists know what's happening in neighboring areas of expertise – everyone's deeply buried in their own research. Clear information seldom comes to the surface, but when it does, amazing stories are unearthed. One would never have guessed that a Romanian innovated this or researched that – something that speaks volumes to the disinterest of the Romanian public. The Monitoring Policy and Research Activities on Science in Society in Europe (MASIS) study finds a shortage of mass media reporting on science-related news in Romania except when an earthquake or other disaster arises.

So why don't Romania's prodigious students return to their country once their studies at internationally acclaimed universities are complete? If they could be inspired to explore research possibilities in their own country, predictions for Romania's future could brighten. Physicist Andrei Dorobantu is optimistic: "While many may question the infrastructure, the ever-changing, corrupt political system, or the lack of funds and then shrug in dismay, things are starting to change". Laboratories once viewed as ill-equipped are being re-

vamped in regions of educational and research cities such as Cluj, Timișoara, Iași, Brașov or Bucharest and these institutions are trying to attract young researchers to join forces.

A case in point

After having struggled to get funding for more than three years, Romania's Nuclear Physics Institute in the town of Măgurele, neighboring Bucharest, is building the Extreme Light Infrastructure - Nuclear Physics (ELI-NP), an extremely high intensity laser beam which will allow the study of phenomena only anticipated in theory until now, such as the vacuum birefringence and the pair creation intense electric fields.

This will be the world's largest laser and reinforces Romania's history of top research in the field of lasers and nuclear physics.

"ELI-NP will thus impact positively not only fundamental science but also it could result in a change of mentality that will boost the entrepreneurial spirit in researchers," says Professor Nicolae-Victor Zamfir, Director of Horia Hulubei National Institute of Physics and Nuclear Engineering (IFINHH). The social impact of this laser in Romania, he explains, is "of major importance to counteract the country's brain drain, by providing the motivation for top young researchers – who might otherwise seek to go abroad in search of better professional opportunities at large scale research centres – to remain in Romania." There is even talk of building a science village in Măgurele, says Zamfir.

BrainRomania.ro is a national database which facilitates collaboration between Romanian researchers to help them build reputation and accelerate scientific progress. The network service was developed in 2012 after the Romanian Scientific Diaspora conference by Executive Agency for Higher Education, Research, Development and Innovation Funding (UEFISCDI) for Romanian researchers and academics located all over the world. One year later, more than 1,000 Romanian researchers have signed on to BrainRomania.ro to make their research more visible.

Local initiatives for education reform

There's big need for change in Romania's kindergarten to grade 12 school system which has been left behind in comparison to other European systems. Growing emphasis on religion has undermined science and evolution studies – something that "speaks to why we are the country that still invests more into building new churches than it does in a better education" says Toma Patrascu, Vice President of the Romanian Secular



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The question is how to channel the expertise gained from RestartEdu and PLACES and tailor a science and innovation infrastructure suited to Romania's historical, geographical, political and economic context.

Humanist Association that promotes ethical humanistic principles, scientific knowledge and the separation of church and state. As science education moves forward in most of the world, Romania remains one of the few places without access to hands-on STEM education.

Miruna Amza, a co-author of this article, is Educational Program Manager for a non-governmental organization called Active for the Future (Activi pentru Viitor), based in Bucharest, where she is active within two major initiatives. RestartEdu brings together top education leaders into periodic brainstorming sessions for ideas and exploring ways in which formal and informal education can be boosted, improved and harmoniously combined.

The other initiative is fueled by the European Commission-funded Platform of Local Authorities and Communicators Engaged in Science (PLACES) project along with organizations such as Ecsite, the European Regions Research and Innovation Network (ERRIN) and the European Science Events Association (Eusea). Active for the Future formed the Bucharest City Partnership under PLACES – a project whose premise is to link science communicators with local policymakers for the social and fiscal development of cities across Europe.

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Children engage in tinkering activities,
Ikedoo Institute, Bucharest, Romania



Pop Up Science Event,
Bucharest, September 2013



features

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The current landscape

Spurred on by the PLACES network of science communicators across Europe, Miruna Amza has begun to promote interaction between different science and society actors to support science, technology, engineering, art and math (STEAM) engagement. The hope is to equip Romania with STEAM education (formal and informal) that aligns with constantly changing technology, social innovation and design thinking. Part of the approach involves place-based learning: Using different spaces to engage people with environmental questions, or opening tinkering labs where citizens can experiment and innovate.

The STEAM Initiative is an informal network of science communicators, citizen associations, NGOs, museums and knowledge hubs – a truly eclectic mix of approaches and ideas with the shared objectives of developing local science communication policies, attracting private sector support and promoting each other's presence in the community.

By researching communities that 'speak the same language,' Active for the Future has pinpointed interesting projects across the country which it is now trying to bridge. Take inventory of some major science education and communication initiatives in Romania and one quickly discovers that most have arisen informally:

- Current or former Polytechnic University of Bucharest students have teamed up in projects such as inventeaza.ro, RoseEdu, FaSCInation which teach children to enjoy questioning things, learning technology and programming, constructing robots, or planning trips to outer space.
- Institutes for education such as Ikedoo are alternative learning places for youth to study architecture and science subjects. Young people are becoming interested in and united by the maker culture, without being very much aware of its importance to science centres and modern Western education. Such initiatives are welcomed with a hunger for knowledge and sometimes even sustained by private schools as a small part of their extensive curricula or integrated into cultural centres and festivals.
- Another wave of enthusiasm has greeted The Hub Bucharest, which advances all sorts of interesting collaborations, including guest-hosting Edusfera's Tincuța Apăteanu – a social entrepreneurial outfit responsible for programmes like Digital Kids, Math Club and DNA Day.
- The Center for Complexity studies has one of Romania's oldest programmes in cross-generational public science communication. Projects such as Atlanty Kron Camp, held in picturesque Capidava County, are reinforced by

The Complexity Café which teaches the science of complexity and the integrated concepts within Earth studies.

- Researcher's Night, a project supported by the EU, took place in 11 Romanian cities in September 2013 cities in Romania.
- The first Bucharest Science Festival brings libraries, institutes, organizations and museums into collaboration.
- The Network of European Museum Association's annual conference is slated for early November 2013. Dragos Neamu, President of the Romanian National Network of Museums, says "Museums in Romania are still lacking initiatives and we hope that this event will benefit and inspire a closer collaboration between institutions and the community."
- Grigore Antipa Natural History Museum in Bucharest was renovated in 2011 with support from the Ministry of Culture and EU Structural Funds. The museum welcomed over 60,000 people in its reopening month – equivalent to an entire year's worth of visitors prior to the museum's renewal. Some of the success is being attributed to the museum's new revitalized approach to telling the stories behind concepts and objects.

The way forward

Despite growing momentum to awaken public interest in science, the problem remains that Romania's government is neither creating scientists nor entrepreneurs. Some say that a change in management is required – from an administrative to entrepreneurial model – to get Romania's science and technology engagement on the right track.

It is the duty of all citizens to make sure their nation becomes a better place to learn, a more accessible place to engage with science and a more fertile environment for the next generation of change-makers. And this next generation of thinkers, innovators, researchers – let's call them troubleshooters – arise from many different communities, not just schools and museums.

Romanians must grasp that their social and economic prosperity depends in many ways on connecting to science and technology and using this connection to meet globally significant challenges. Science engagement and innovation are still scarce but developing in this country, and, glancing into the future, one can see that a growing community of science communication practitioners and consumers will only push Romania forward.