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# THE ‘C’ IN IRCAM: COORDINATING MUSICAL RESEARCH AT IRCAM

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## ABSTRACT

This report summarizes recent attempts at IRCAM for coordination of scientific research and musical production. We describe the social context surrounding *musical research* and report on recent actions and projects in 2009 and 2010, notably the new *musical research residency program*, and contemplate on future plans.

## 1. INTRODUCTION

IRCAM<sup>1</sup> is one of the world’s largest public research centers dedicated to both musical expression and scientific research, located at the heart of Paris, and with more than 30 years of history. IRCAM is a unique location with the aim of establishing a dialog between scientific and technological innovation with artistic sensibilities. In terms of human resources, it is made up of more than 150 collaborators<sup>2</sup> bringing together scientific researchers, PhD students, young composers and established artists to create a transversal environment dedicated to computer music with constant renewal in the research and artistic parts of the institute. The extent of activities at IRCAM range from *research and development* including 9 research departments, artistic production and diffusion, and in addition a musical season and the summer Agora festival, education and cultural outreach, and, finally, a multimedia library<sup>3</sup>. To this end, providing an activity report for the ensemble of the institute is beyond the scope of this report but can be consulted via the web<sup>4</sup> for each consecutive year.

At the heart of the institute’s objectives is the coordination of scientific and musical research (the C of IRCAM) with the aim of creating productive links between the two hemispheres inside the institute as well as partners outside. Therefore, a dedicated department has taken on this role of coordination of musical research at IRCAM. Since 2008, this department has been enforced with the aim of extending musical research within IRCAM and outside. The present report is thus a summary of the activities of this department.

We start this report by defining the context of *musical research* in section 2. In section 3 we expose the activities of the coordination department for this aim, and continue by reporting recent and future activities in section 4. We end this report by contemplating on future plans.

## 2. WHAT IS MUSICAL RESEARCH?

The department for the Coordination of Scientific and Musical Research (MRC)<sup>5</sup> aims at elevating interaction between various scientific and artistic projects and departments at IRCAM. It offers experimental environments where composers strive to enlarge their musical experience at one end, and scientists aim at extending research and technological paradigms for new artistic expressions. We call this interactive process *Musical Research* that has been at the core of IRCAM’s foundation since its inception [1]. This section attempts to address important social issues regarding musical research. A through definition is thus beyond the scope of this report. See [3] for an excellent synthesis of the concept.

Musical research in its merits and structure is different from that of scientific research or artistic production. The subject of a musical research project neither pre-exists *prior* to its inception (such as *a priori* knowledge of a composer used during the process of creation), nor is it a *posterior* reflection on pre-existing material (such as academic or classical music theory) [2]. Musical research is a project with double initiatives from artistic and scientific communities. It consists of joint projects that culminate in the creation of new art works, as well as the development of polyvalent tools and concepts that make the communication and inspiration between the two worlds possible. A musical research project should enrich the intuitions of the artist as well as guiding and evolving initial scientific challenges and objectives.

The common factor between all partners in a musical research project is the *process of creation* (both artistic and scientific) that goes beyond (but does not exclude) scientific justification, artistic organization of materials, and passive cohabitation of the two communities. When considering an ensemble of such projects, the task of coordinating musical

<sup>1</sup>Institute for Research and Coordination of Acoustics/Music

<sup>2</sup><http://www.ircam.fr/64.html?&L=1>

<sup>3</sup>For an overview, see the following link and references therein:

<http://www.ircam.fr/departements.html?&L=1>

<sup>4</sup><http://www.ircam.fr/65.html?&L=1>

<sup>5</sup><http://www.ircam.fr/41.html?&L=1>

research bypasses that of conventional research or mediation management. The initiatives for musical research thus remain individual and unpredictable. In this context, the *MRC* department does not constitute a scientific or artistic identity in itself, but provides and creates infrastructures where such attempts can emerge and become possible.

### 3. COORDINATION OF SCIENTIFIC RESEARCH AND MUSICAL PRODUCTION

A unique feature of the work environment at IRCAM is the constant movement and renewal of its collaborators. Besides the administrative body and a subset of researchers who are largely permanent, the R&D sector is constantly renewed by PhD students, interns and visiting scholars. The list of such turnover in the R&D department goes beyond the scope of this report. The artistic body on the other hand and by definition, is not made up of any permanent body. This is probably the most distinguishing factor between IRCAM and similar studios with permanent composers. The body of composers and artists at IRCAM are constantly renewed each year as a function of the musical season, ongoing projects and students in the 2-year compositional *Cur-sus* program<sup>6</sup>. This structure allows for constant renewal of musical research as well as a response to the diversity of activities in the computer music community.

This wide mobility, as well as the diversity of topics in both parties require overall strategies to bring both hemispheres of scientific and artistic research together. This is the task of the *MRC* department at IRCAM. The department brings in scientific researchers and artists through various platforms available which are discussed hereafter.

#### 3.1. Computer Music Designers

Computer Music Designers, formerly called *musical assistants*, are at the heart of the intersection between scientific research and artistic production at IRCAM<sup>7</sup>. Computer Music Designers constitute a pluridisciplinary body of individuals with competence in musicianship, music composition, computer music research, realization and pedagogy. Besides collaboration with artists, they maintain the necessary dialectical connection between the R&D department and artistic projects and explicitly manage the double-entries needed to achieve a successful musical research project.

The role of computer music designers goes beyond computer music programming or realization which is prominent by observation of their various activities in recent years: ranging from composition, to research, software development, and collaborative art production. The important role

of computer music designers is not limited to IRCAM and the practice exists in various forms worldwide. The status of computer music design was the subject of a symposium in 2007 at IRCAM where a body of European computer music designers sought a consensus on official recognition of this well-established occupation. With the wide acceptance of computer music programs worldwide, the recognition of this stature, half-way between academic and the consumer worlds, is needed more than ever. There is still a lot of effort needed to this end and the international computer music communities should collectively get involved.

Starting in 2009, the role of computer music designers at IRCAM as leaders of musical research and computer musicianship has been enforced and explicitly formulated. Each computer music designer hence becomes a privileged liaison to specific R&D projects and as a function of their preferred activity. Reports and papers by computer music designers are available on the department's website.

#### 3.2. Composer in Research Program

Each year the institute hosts an average of 8 composers in the *composer in research* program as a traditional means for supporting musical research at IRCAM and providing a platform for close collaboration between artists and researchers. These are generally projects initiated by composers aware of the state-of-the-art research that go beyond technological tools and where both parties can change the course of research and artistic realization during the project. In such cases, before the usual production period with electronic realization, the composer and computer music designer will get involved in the research and development of new research paradigms and tend to inscribe new musical ideas and vocabularies into the research workflow. A *composer in research* is officially contracted and the project usually culminates to new musical works followed by concerts as well as joint presentation and publication of achievements.

The *composer in research* program is also a means for following a composer through her passage within IRCAM, whether coming from one of the training programs or productions, accommodating means to express new ideas that lie at the intersection of scientific research and artistic realization.

#### 3.3. Musical Research Residency Program

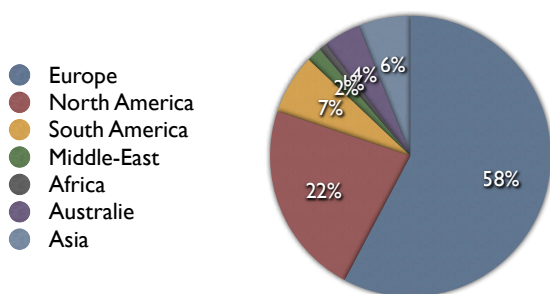
In the past decade, computer music knowledge in its various forms has spread itself widely over the entire world. This has been followed by wide acceptance of computer music research in many universities and professional associations worldwide. To respond to this process of democratization, and to broaden and diversify residency opportunities, the *musical research residency program* was created in 2009. This program follows the same lines as in *composer in research* program, but is open to all participants through an

<sup>6</sup><http://www.ircam.fr/134.html?&L=1>

<sup>7</sup>As of 2009, permanent computer music designers at IRCAM include: Greg Beller, Eric Daubresse, Thomas Goepfer, Emmanuel Jourdan, Serge Lemouton, Jean Lochard, Grégoire Lorieux, Benoit Meudic, Mikhail Malt, Robin Meier, Gilbert Nouno and Manuel Poletti.

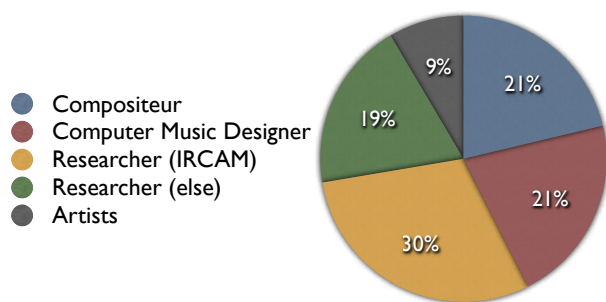
open call for projects. Applications are evaluated by an international panel of experts and each laureate is granted funds and residency at IRCAM within research teams consistent with the original proposal.

The first edition of the residency for 2010 was launched early 2009 and served as a pilot case for future editions. The calls went out in spring 2009 with an online submission deadline of July 31<sup>st</sup>. More than 110 applications were received upon which 95 were considered as complete. Figure 1 shows the demographic distribution of submissions.



**Figure 1.** 2010 Musical Research Residency Applicant Demographics

The review panel consisted of an international group of 40 experts ranging from researchers, artists, composers and computer music designers. Figure 2 shows this distribution. Each application was evaluated by a maximum of 3 reviewers. Special attention was paid to matching application topics with that of reviewers, and in assignment of reviewers so that each application could receive reviews from the various disciplines presented in fig. 2. Evaluation was based on musical quality, novelty, research relevance, and practicality.



**Figure 2.** 2010 Musical Research Residency Review Panel Statistics

For the first edition of the *musical research residency* program, the two highest ranked proposals after reviews were announced as laureates. To encourage outside participation, we limited this first edition to participants not known to the

IRCAM artistic scene. Due to its success we are hoping to expand this new program in future editions.

#### 4. MUSICAL RESEARCH 2009 – 2010

As mentioned earlier, the MRC department provide institutional support for certain projects initiated by researchers and artists as *musical research* with strong artistic ambition that bring in both scientific and artistic hemispheres together. Musical research in essence goes beyond this official support and spans most ongoing production and collaborative projects at IRCAM. This section summarizes the main projects supported by the department in 2009 and 2010.

Table 1 shows a thematic summary of musical research projects undertaken during the 2009 musical season. It shows the holders of the projects (with a majority of composers and one researcher), as well as summarized thematics, concerned tools where appropriate, and the research teams involved. Wherever appropriate, the computer music designer associated with the project appears in parentheses. It should be noted that the role of computer music designers in this context goes beyond *design* or *realization*, but rather they serve as mediators between the research and artistic worlds and maintain the history and memory of musical research in the institute. Acronyms for team names are provided at the bottom of the table. Reports and documents pertaining to each project can be consulted on the department website.

**Table 1.** 2009 Musical Research Projects.

Personalities	Themes/Tools	Team*
M. Stroppa	High-level control of sound synthesis, OM Chroma	RepMus
L. Pagliei (J. Lochard)	Realtime instrumental control of physical models in Modalys	InsAc
G. Spiropoulos (B. Meudic)	Voice Processing, SuperVP	AnaSyn
Y. Robin	Automatic Improvisation, OMax	RepMus
V. Nicolau (S. Lemouton)	Polyphonic live accompaniment, Antescofo	IMTR
H.P. Stubbe (T. Goepfer)	Multiphonics in Modalys	InsAc
G. Carpentier	Computer Assisted Orchestration, Orchidée	RepMus

\* RepMus: *Musical Representation*

\* InsAc: *Instrumental Acoustics*

\* AnaSyn: *Analysis/Synthesis*

\* IMTR: *Realtime Musical Interaction*

Among the projects presented in table 1, two projects resulted in new musical works based on the associated themes in the 2009 musical season. The Nicolau project resulted in the premiere of a fully polyphonic score for a piece for vibraphone and live electronics in form of automatic accompaniment, and was presented during the 2009

*Agora Festival*. The Stubbe project resulted in close collaboration with the Instrumental Acoustics team to develop a realtime model of a complete bass-clarinet to be used in a composition for soloist and electronics, that explores the relation between an acoustic woodwind instrument and a similar virtual one. A new musical work based on this technology was presented in a *Tremplin* concert in October 2009. The Pagliei, Spiropoulos, and Robin projects are planned for later productions at IRCAM in future seasons; and the Stroppa project is an ongoing collaboration that will be extensively explored for the creation of his new opera in 2012.

Table 2 shows projected musical research projects for 2010. Compared to table 1, there are two projects that are maintained from 2009 that needed longer collaboration with respected R&D departments, and the laureates of the new *musical research residency* program are also integrated. Another new element is the presence of a *performer in research*. Obviously performers are among major forces present in the institute. This new element formalizes a more sustained research relationship with certain musicians who are willing to expand their instrument vocabularies through novel research paradigms. Within this list, the Fedele, Aperghis, Rivas and Cifuentes projects are planned for later productions during the 2010 – 2011 musical season and the performer in residence will interact with one or several projects during the year. The Rizo-Salom project underlies a prospective research on the instrumental control of sound directivity, or the formalization of recent techniques for spatial directivity reproduction for spatial electroacoustic composition.

**Table 2.** 2010 Musical Research Projects

Personalities	Themes/Tools	Team*
M. Stroppa	High-level control of sound synthesis, OM Chroma	RepMus
L. Pagliei (J. Lochar)	Gestural control of physical models in Modalys	InsAc
I. Fedele (T. Goepfer)	Gesture Following and Analysis	IMTR
G. Aperghis (G. Beller)	Voice Synthesis	AnaSyn
R. Rivas (M. Malt)	Compositional control of sound synthesis, OM Chroma	RepMus
M.S. Cifuentes	Live Mosaicing and control of concatenative synthesis	IMTR
L.R. Salom (G. Lorieux)	Sound Directivity Control	Spat/PdS
D. Ciampolini	Performer in residence (percussion)	
B. Hackbarth†	Template-based control of concatenative synthesis	IMTR
M. Kimura†	Augmented Violin	IMTR

\* Spat: *Room Acoustics team*

\* PdS: *Sound Design and Perception*

† 2010 Musical Research Residency Laureates

## 5. FUTURE PERSPECTIVES

This report discussed recent efforts by the *Musical Research Coordination* department for coordination of musical research at IRCAM. The role of the department is to strengthen ties between artistic production and scientific research, fortify the exchange between the two communities, and to create opportunities for new artistic expressions. Reporting on all IRCAM activities on computer music, given the size and capacity of the institute, is beyond a short studio report. We therefore concentrated on generalities of musical research coordination and suggest curious readers to consult numerous documents and reports on IRCAM's website.

We elaborated on three institutional elements that create and maintain the flow of musical research at IRCAM: *computer music designers*, *composer in research program*, and *musical research residency*. We introduced the new *Musical Research Residency Program* initiated in 2009 and inaugurated for the 2010 season. The aim of this program is to extend musical research opportunities to new ideas and personalities worldwide, and as a response to a recent exciting democratization process of computer music knowledge. Following the success of its first edition, we are looking forward to expand this opportunity in future editions by attracting more daring projects in computer music and creating better and more residency opportunities.

We briefly discussed the social complexity behind the idea of *musical research*, which must be of utmost importance to the computer music community, as a recognition of efforts at the intersection of the sciences and the arts. We discussed institutional instruments to enhance such intersections of different practices at IRCAM. Despite the importance of musical research and beyond our institution, one can observe a tendency for informal cohabitation of scientific and artistic communities worldwide; relying on short-term and simplistic discourses for demonstrative purposes. This paper does not claim to provide a solution to this complex sociological problem but attempts to discuss solutions at IRCAM. With the fast spread of computer music cultures world-wide, we should get ready to question existing, accessible and ready-to-implement academic templates in their capacities to provide the necessary structure for musical research. Are we ready for this challenge?

## 6. REFERENCES

- [1] P. Boulez, *Leçons de musique*. Editions Christian Bourgois, 1977, ch. Invention/Recherche.
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- [3] J.-C. Risset, "Le compositeur et ses machines - de la recherche musicale," *Esprit*, no. 99, pp. 59–76, 1985.