

Inria

RESEARCH CENTER

FIELD

**Applied Mathematics, Computation
and Simulation**

Activity Report 2019

Section Popularization

Edition: 2020-03-21

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ACUMES Project-Team

9.3. Popularization

9.3.1. Articles and contents

- "On the optimal shape of a wing", R. Duvigneau, *Interstices*, September 2019.
- A.S. Ackleh, R.M. Colombo, P. Goatin, S. Hille and A. Muntean, *Mathematical modeling with measures*, *Nieuw Archief voor Wiskunde*, Part 20 n. 3, September 2019.

9.3.2. Interventions

- R. Duvigneau gave three talks on "Modeling and simulation: when engineering becomes numerical" at Lycée Jules Ferry, Cannes, March 2019.
- P. Goatin gave the talk "*Le trafic routier en équations*" in Biot (Alpes Maritimes, France) on January 31, 2019, as part of the conference cycle "Science pour Tous 06".
- A. Habbal contributed to Cafe'In talks on "*Tumoral Angiogenesis*", June 2019.

CAGIRE Project-Team (section vide)

CARDAMOM Project-Team (section vide)

DEFI Project-Team

8.3. Popularization

- M. Bonazzoli and L. Chesnel made a presentation in the context of the Fête de la science 2019 to several groups of young students (from 10 to 17 years old).
- M. Bonazzoli was representative for SMAI at the Métiers des Maths stand at the 20th Salon Culture et Jeux Mathématiques.

8.3.1. Internal or external Inria responsibilities

- P.M. Congedo is Deputy Coordinator of "Maths/Engineering" Program of the Labex Mathématiques Hadamard.
- J.R. Li is Member Elu of Inria Commission d'Evaluation, 2015-2019.
- M. Bonazzoli is the International partnerships Scientific Correspondent for Inria Saclay.

8.3.2. Internal action

- M. Bonazzoli, H. Haddar and J.R. Li monitored an internship at Defi team for 6 middle school students (one afternoon).

ECUADOR Project-Team (section vide)

ELAN Project-Team

9.3. Popularization

9.3.1. Articles and contents

- Focus on our cloth simulator [Argus](#), on a [video](#) prepared by A. Aftalion and published in February 2019 in <http://video.math.cnrs.fr>.

GAMMA Project-Team (section vide)

MATHERIALS Project-Team

9.4. Popularization

9.4.1. Internal or external Inria responsibilities

- A. Levitt is a member of the editorial board of Interstices, Inria's popularization website,
- C. Le Bris has presented the project-team at "Mon équipe en 180 secondes", on November 7, 2019.

9.4.2. Articles and contents

- V. Ehrlacher has been interviewed for the online magazine "DigiSchool"
- G. Robin has been interviewed for the online magazine "Usbek et Rica" following her "L'Oréal-UNESCO For Women in Science" prize

9.4.3. Internal actions

- C. Le Bris has organized a research day for the students at École des Ponts on November 6, 2019.
- V. Ehrlacher has participated to a meeting "Mathématiques, nom féminin?" organized at Ecole des Ponts with pupils from middle school.

MEMPHIS Project-Team (section vide)

MEPHYSTO Team

7.3. Popularization

7.3.1. Interventions

M. Simon participated in the programs “Chercheurs itinérants” and “Fête de la Science”, and gave several lectures aimed at high-school students.

MINGUS Project-Team

9.3. Popularization

9.3.1. Internal or external Inria responsibilities

- F. Castella was member of the HCERES committee for the evaluation of the laboratory "Mathématiques et Informatique pour la Complexité et les Systèmes (MICS)", CentraleSupélec, Gif-sur-Yvette.
- P. Chartier was member of the hiring committee CR2-Inria (Bordeaux)
- P. Chartier was member of the hiring committee for the Inria promotion DR1-DR0.
- N. Crouseilles is member of the Inria Evaluation Committee (2019-2023).
- N. Crouseilles was member of the Inria hiring committee for the following Inria promotions: CRHC, DR2-DR1, DR1-DR0, DR0-DR02.
- N. Crouseilles is member of the hiring committee of the professor position, ENS Rennes.
- E. Faou was member of the CNU 26 until the summer 2019.
- E. Faou was member of the HCERES committee for the evaluation of the Mathematics Institute of Toulouse, University Paul Sabatier.
- E. Faou is AMIES correspondent (Agency for Interaction in Mathematics with Business and Society) for Inria Rennes Bretagne atlantique and IRMAR.

9.3.2. Interventions

- N. Crouseilles: participation to high school students internship at IRMAR laboratory (one week), June 2019.
- N. Crouseilles: interview by a first year student of University Rennes I (in order to inform the different ways to become Inria researcher).
- J. Massot: talk at the N. Mandela high school (terminal S classes) about the links between astronomy and mathematics, April 2019.
- J. Massot: participation to high school students internship at IRMAR laboratory (one week), June 2019.
- P. Navaro: participation to the Julia day, Lyon, France, January 2019.
- P. Navaro: participation to the Julia day, Nantes, France, June 2019.
- A. Rosello: participation to "MATHC2+", June 2019, ENS Rennes.
- L. Trémant: participation to "Maths en Jean", June 2019, University of Rennes.

9.3.3. Internal action

- J. Massot: writing of a Python library *ponio* (Python Objects for Numerical IntegratOr) <https://pypi.org/project/ponio/0.1/>
- P. Navaro: Python training at the IRMAR laboratory.
- P. Navaro: Julia training at the IRMAR laboratory.
- P. Navaro: R training at the Finist'R internal workshop, Roscoff, France, August 2019.
- P. Navaro, Python courses, within the exchange program between ENSAI and Hong Kong university.

MOKAPLAN Project-Team

7.3. Popularization

- I. Waldspurger, *Quand les films prennent des couleurs*, exposé au cycle SMAI & Musée des arts des métiers

NACHOS Project-Team (section vide)

NANO-D Team (section vide)

POEMS Project-Team

9.3. Popularization

9.3.1. Internal or external Inria responsibilities

- A.-S. Bonnet-Ben Dhia is a member of the *bureau du comité des équipes-projets* (BCEP)
- P. Joly is a member of the *commission consultative paritaire scientifique* of Inria
- M. Kachanovska is a member of the *comité scientifique* of Inria-Saclay

9.3.2. Education

- Permanent members of POEMS are involved in the management of the engineering program at ENSTA Paris, the program in applied mathematics at IP Paris, the master 2 program "*Analyse, Modélisation et Simulation*" (M1 AMS) and the master 2 program "*Modélisation et Simulation en Mécanique des Structures et Systèmes Couplés*" (M2 MS2SC) of Université Paris-Saclay:
 - M. Bonnet: co-chair of the M2 MS2SC;
 - L. Bourgeois: co-chair 1A ENSTA until August 2019; co-responsible 2A ENSTA since Septembre 2019; co-chair of the M1 in applied mathematics since Septembre 2019;
 - P. Ciarlet: co-chair 3A ENSTA; deputy head of the M2 AMS until August 2019; coordinator of the master program in applied mathematics at IP Paris;
 - S. Fliss: co-chair of the M2 AMS since septembre 2019.

9.3.3. Interventions

- P. Joly presented a talk entitled "*Mathématiques autour de la musique et d'un piano*" during a scientific session at the *Musée des arts et métiers* (March 12, 2019 at Paris) and at the IECL (October 17, 2019 at Nancy).

RAPSODI Project-Team

10.3. Popularization

C. Calgario is in charge of the communication of the Laboratoire Paul Painlevé. She organized in 2019 various events to promote mathematics among young people:

- “Les mathématiciens de Lille fêtent les 80 ans du CNRS” (about 600 participants from high-school or Classes Préparatoires);
- a conference of E. Ghys for the presence of the Jury de l’Agrégation de Mathématiques in Lille (about 200 participants);
- les “Mathématiques itinérantes”, a series of conferences in high-schools.

E. Creusé gave two popularization talks at Université Polytechnique Hauts-de-France:

- “Le calcul scientifique pour la simulation et le contrôle des écoulements” for the first Rencontres Mathématiques Valenciennes in March;
- “Comment prévoir la population de poissons dans l’océan ou le déplacement d’oiseaux migrateurs dans le ciel ? Les maths nous répondent !” for the Semaine des Mathématiques 2019 in March.

M. Herda gave a talk at Inria Lille - Nord Europe for the internal scientific popularization event “30 minutes of Science” in January.

T. Rey was one of the four speakers of the event “Les mathématiciens de Lille fêtent les 80 ans du CNRS”.

CAGE Project-Team

9.3. Popularization

9.3.1. Internal or external Inria responsibilities

Emmanuel Trélat is member of the Comité d'Honneur du Comité International des Jeux Mathématiques

9.3.2. Articles and contents

- The work [7] by Pierre Martinon has been popularized in the article “Athlétisme, affaire Dreyfus, itinéraire des éboueurs... Comment les maths irriguent notre monde” by Soline Roy, appeared in *Le Figaro*, 1/1/2019.
- Emmanuel Trélat has been interviewed, as director of the Fondation Sciences Mathématiques de Paris, in *Le Figaro*, 2/1/2019.

9.3.3. Interventions

- Emmanuel Trélat gave a cycle of lectures at “Sciences et Société”, Nancy
- Emmanuel Trélat gave a lecture at Bibliothèque Nationale de France (BNF) (<https://vimeo.com/313123529>)
- Emmanuel Trélat gave a general public lecture at “Mois de l’optimisation”, Limoges
- Emmanuel Trélat gave a general public lecture in Padua, Italy

COMMANDS Project-Team

9.3. Popularization

- F. Bonnans: codirection of a joint Allistene-Ancre commission (contribution to the national strategy for research), Numerics and Energy committee (2017-2019).
- F. Bonnans: Dimitrie Pompeiu Prize Committee (Academy of Romanian Scientists).

DISCO Project-Team

7.3. Popularization

7.3.1. Interventions

- The team welcomed Sophie Merheb, high-school student of Lycée privé Notre-Dame Les Oiseaux, Verneuil-sur-Seine, for the period 17-26 June 2019.

FACTAS Project-Team

9.3. Popularization

9.3.1. Internal or external Inria responsibilities

M. Olivi was responsible for Scientific Mediation and president of the Committee MASTIC (Commission d'Animation et de Médiation Scientifique) <https://project.inria.fr/mastic/> until October 30.

9.3.2. Articles and contents

M. Olivi wrote a review of the book “Algorithms: la bombe à retardement” by C. O’Neil for Interstice <https://interstices.info/sciences-du-numerique-et-impact-sur-la-societe/>

9.3.3. Education

“La fête des Maths de l’ESPE Nice-Liégeard” (March 5 and 26): M. Olivi animated two half-day workshop sessions “jouons avec des expériences scientifiques” <https://pixees.fr/jouons-avec-des-experiences-scientifiques/> for primary school students.

9.3.4. Interventions

- “Fête de la science: Mouans-Sartoux fête les sciences du quotidien” (October 10-11 for scholars: 8 classes, October 12 for public: 1000 people): M. Olivi animated the activity “jouer à transmettre des images” in collaboration with the “espace de l’art concret” <https://www.espacedelartconcret.fr/>.
- “Stage MathC2+” (June 19-22): M. Olivi animated a workshop session on “How to analyze sounds with mathematical functions”.
- V. L. Coli gave a talk “Archéologie et mathématiques : algorithmes pour l’identification des gestes des premiers potiers”, and participated to the organization of the exhibition of the ANR project CIMO, Forum des Sciences, 80 years of CNRS, October, CIV, Valbonne.
- Fabien Seyfert gave a pitch on Factas activities during the visit of the company SICAME (March 27) and Martine Olivi gave a pitch on Factas activities for the celebration of InriaTech 10th birthday (April 3)

9.3.5. Internal action

- S. Chevillard gave a talk “Réchauffement climatique : où en est-on ? où va-t-on ?” at the c@fé-in of the Research Center, November.
- V. L. Coli gave a talk “Archéologie et mathématiques : algorithmes pour l’identification des gestes des premiers potiers” at the c@fé-in of the Research Center, October. She also participated to the organization of the “1er Colloque doctoral préhistoire, paléoenvironnement, archéosciences”, November, MSHS, Nice, <https://www.cepam.cnrs.fr/evenement/1er-colloque-doctoral-prehistoire-paleoenvironnement-archeosciences/>, where she gave a talk “Approches mathématiques pour la caractérisation des poteries néolithiques”.
- M. Olivi co-organized about 10 “cafés scientifiques” (c@fé-in’s and cafés Techno, 30 to 80 participants each) <https://project.inria.fr/mastic/category/cafein/>

9.3.6. Creation of media or tools for science outreach

M. Olivi co-supervised the creation of new scientific wooden objects by SNJ AZUR (funds from APOCS region): pixel art and transmission of images <https://pixees.fr/jouer-a-transmettre-des-images/>, IA machine. She also co-supervised the creation of videos by Thibaut Ehlinger (internship) and Gregory Casala (apprenti), funds from Class’Code and the national network, see <https://pixees.fr/pause-ta-science-une-chaine-pour-decrypter-les-objets-scientifiques/>.

I4S Project-Team

9.3. Popularization

9.3.1. Internal or external Inria responsibilities

- L. Mevel is member of CLHSCT committee in Rennes.
- L. Mevel is member of Comité de centre committee in Rennes.
- L. Mevel is Head of Science in 2nd of Inria Rennes Center.
- V. Le Cam is Head of SII LAB at IFSTTAR Nantes.
- J. Dumoulin is scientific Head SII LAB at IFSTTAR Nantes.

9.3.2. Articles and contents

9.3.2.1. Encyclopedia article on nonlinear system identification

In the second edition of Encyclopedia of Systems and Control, published by Springer in September 2019, the article on nonlinear system identification authored by Q. Zhang has been updated with the latest progresses on this topic.

Nonlinear mathematical models are essential tools in various engineering and scientific domains, where more and more data are recorded by electronic devices. How to build nonlinear mathematical models essentially based on experimental data is the topic of this entry. Due to the large extent of the topic, this entry provides only a rough overview of some well-known results, from gray-box to black-box system identification. DOI: https://doi.org/10.1007/978-1-4471-5102-9_104-2

9.3.3. Interventions

M. Doehler and Q. Zhang participated the outreach activity "J'peux pas, j'ai informatique" for school classes on April 2, 2019.

9.3.4. Creation of media or tools for science outreach

9.3.4.1. Showroom demonstrations

A damage localization mockup has been developed and installed in the showroom of Inria Rennes. It has been the support for a demonstration for the outreach activity "J'peux pas, j'ai informatique" for school classes on April 2, 2019, showing that computer science also can be related to physics and statistics. An ADT Carnot has been funded on that topic and will help the maturation of such project.

MCTAO Project-Team

10.3. Popularization

10.3.1. Internal or external Inria responsibilities

J.-B. Caillau belongs to the MASTIC initiative at Inria Sophia.

10.3.2. Interventions

Lamberto Dell'Elce is involved in the PoBot challenge promoted by MEDITES. Specifically he supervises a class in the College Emile Roux in Cannes.

J.-B. Caillau has given several talks at high-school level in Nice and Sophia on application of mathematics in social choice.

NECS Team

10.3. Popularization

10.3.1. Education

Maria Laura Delle Monache gave a talk to students of 8th grade (4ème) and 11th Grade (1ère) in the Cérémonie de remise de prix des Olympiades de Mathématiques, La mobilité et les véhicules autonomes, , Université Grenoble Alpes, France, May 2019.

QUANTIC Project-Team

8.3. Popularization

8.3.1. Articles and contents

- Zaki Leghtas article in Usbek and Rica (<https://usbeketrica.com/article/aucun-etat-veut-rater-coche-ordinateur-quantique>)

8.3.2. Interventions

- Zaki Leghtas: Pint of Science on quantum computing

SPHINX Project-Team (section vide)

TRIPOP Project-Team (section vide)

TROPICAL Project-Team

10.4. Popularization

10.4.1. Articles and contents

- The collaboration developed by our team since 2014, with Préfecture de Police, on the performance evaluation of the new organization (PFAU, Plate forme d'appels d'urgences) to handle the calls to the emergency numbers 17-18-112 in the Paris area is described in the following article, published on the Inria web site, <https://www.inria.fr/centre/saclay/actualites/gestion-des-appels-d-urgence-une-geometrie-tropicale-pour-les-secours-parisiens>

VALSE Project-Team

9.3. Popularization

9.3.1. Internal or external Inria responsibilities

At Inria (Lille), R. Ushirobira is responsible for a monthly organized talks “30 minutes de sciences”.

9.3.2. Education

- R. Ushirobira, referent researcher for projects with middle-school students at Collège A. Daudet (Leers) within the framework of **Math en Jeans**

BONUS Project-Team

10.3. Popularization

10.3.1. Internal or external Inria responsibilities

- N. Melab: Chargé de Mission of High Performance Computing and Simulation at Université de Lille, since 2010.

10.3.2. Internal action

- A. Liefoghe: 30 minutes de sciences, Inria Lille-Nord Europe, Lille, France, June 2019.
- O. Abdelkafi: Intervention auprès des inspecteurs d'académie, Inria Lille-Nord Europe, Lille, France, Mars 2019.

CELESTE Project-Team

8.3. Popularization

8.3.1. Interventions

- Public exhibitions: S. Arlot is member of the steering committee of a general-audience exhibition about artificial intelligence, that is co-organized by Fermat Science (Toulouse), Institut Henri Poincaré (IHP, Paris) and Maison des Mathématiques et de l'Informatique (MMI, Lyon).

GEOSTAT Project-Team (section vide)

INOCS Project-Team

10.3. Popularization

- Luce Brotcorne, Journées scientifiques de l’Inria, Lyon, June 2019
- Frédéric Semet, Cité de l’IA - Intelligence Artificielle, MEDEF Lille Métropole, April 2019
- Maxime Ogier, Frédéric Semet, 4ème séminaire humAIn : IA, optimisation et retail - logistique, Polytech Lille, October 2019

10.3.1. Internal or external Inria responsibilities

- Frédéric Semet, 30 minutes de sciences, Inria Lille Nord Europe, April 2019

MISTIS Project-Team

10.3. Popularization

10.3.1. Interventions

- Sophie Achard has been invited to Festival des Nouvelles Explorations <https://nouvelleexplorations.com/>.
- Julyan Arbel gave a presentation for ISN conference, March 2019.

MODAL Project-Team

10.3. Popularization

10.3.1. Internal or external Inria responsibilities

Christophe Biernacki acts as a member of the working group calculation for Inria.

10.3.2. Interventions

- Pascal Germain participated in the school activity “Jouer à débattre” of the organization “L’arbre des connaissances”, as an expert in artificial intelligence (Lycée EIC de Tourcoing, February 7, 2019).
- Pascal Germain gave a vulgarization talk about neural networks and deep learning at the “Journée de l’Enseignement de l’Informatique et de l’Algorithmique” (Université de Lille, March 6, 2019).
- Christophe Biernacki participated in a round table “Deep Learning for PHM: Opportunities and Challenges”, The 10th Prognostics and System Health Management Conference Paris, France, May 2 - May 5, 2019.
- Christophe Biernacki gave a talk at the Forum Teratec in June 12nd 2019, Ecole Polytechnique, Palaiseau with Margot Correard (DiagRAMS) on Predictive maintenance solution without additional sensors [40].
- Cristian Preda was invited as a speaker at IoT Week on predictive maintenance, Méaulte, December 4, 2019.
- Cristian Preda was invited as a speaker at IT Tour by Le Monde Informatique on artificial intelligence, November 14, 2019.

RANDOPT Project-Team

10.3. Popularization

- Scientific mediation by Cheikh Touré: presentation on poker in the context of the visit of college and high school students to Inria Saclay

10.3.1. Internal or external Inria responsibilities

- Anne Auger: member of the BCEP of Saclay.
- Dimo Brockhoff: member of the CDT committee of Saclay (since February 2019).

REALOPT Project-Team

10.3. Popularization

- Local events: Participation to "Journée emploi maths et interaction 2019". This day aims to bring together students, researchers and practitioners in mathematics in the Bordeaux area. <https://uf-mi.u-bordeaux.fr/sites/jemi/>

10.3.1. Interventions

- Participation to Circuit Scientifique Bordelais (Fête de la Science)
- Participation to the 80th anniversary of CNRS

SEQUEL Project-Team

10.3. Popularization

10.3.1. Articles and contents

- Philippe Preux:
 - interviewed by *Le Monde* published in Sep 2019
 - interview on I-SITE project B4H, Inria

10.3.2. Education

- Odalric-Ambrym Maillard:
 - “Reinforcement Learning: successes and promises”, Executive Master, Ecole Polytechnique, Palaiseau, Nov 2019

10.3.3. Interventions

- Philippe Preux:
 - panel on “Promises and perils of AI”, CGIAR, Hyderabad, India, Oct 2019
 - panel on “AI and man”, Euratechnologies, Lille, Sep 2019
- Yannis Flet-Berliac and Philippe Preux: panel on “Who’s the pilot: man of software?”, FOOR, Le Fresnoy, Tourcoing, Nov 2019
- Yannis Flet-Berliac: “Princess of parallelograms” installation (with Thomas Depas), Le Fresnoy, Tourcoing, “Damien & The Love Guru” gallery in Brussels, Belgium, Sep–Dec 2019



Figure 1.

Princess of parallelograms is a collaborative project between Yannis Flet-Berliac and a student from Le Fresnoy National Studio of Contemporary Arts. They created an interactive sculpture made of a variety of computer vision attributes: a support for anthropomorphic projections, a set of generated virtual masks, or a new form of photographic trap. When visitors stand in front of the device’s webcam, a Deep Convolutional Conditional-GAN Auto-Encoder model applies a filter on their face with virtual flesh, hair, and facial expressions in real-time. In the meantime, an emotion detection model trained on the FER-2013 dataset is running in the background. The system allows the users to actively interact with the installation. So far, the project has been exposed at Le Fresnoy and in Brussels.

SIERRA Project-Team

10.3. Popularization

- Participation to "Fête de la Science" (with the Apprenti Illustrateur).

TAU Project-Team

10.3. Popularization

10.3.1. Articles and contents

- Michèle Sebag - *Il faut dissiper le malentendu sur “les prétentions infondées” de l’intelligence artificielle*, tribune du journal *Le Monde* du 12 août 2019.
- Paola Tubaro - BBC World service, *The ‘microworkers’ making your digital life possible*, 02/08/2019; Radio France Inter, *Travailleurs du clic, les soutiers du clavier*, 23/03/2019; Science & Vie, *La force de l’IA repose sur des travailleurs bien r’eels*, 24/10/2019; AFP/L’Express, *Les travailleurs du clic, petites mains invisibles de l’économie numérique*, 21/06/2019; CNRS Le Journal, *Ces microtravailleurs de l’ombre*, 24/05/2019; Le Monde, *Jobs du clic : la France compte plus de 250 000 micro-travailleurs*, 15/02/2019; L’Humanité Dimanche, *Travailleuse du clic, la double invisibilité*, 02/05/2019.

10.3.2. Interventions

- Guillaume Charpiat - *Génomes présents, histoires d’antan: Apprentissage profond pour la génétique des populations*, Inria Seminar Unithé ou Café with Flora Jay, Feb 2019.
- Marc Schoenauer - *Intelligence Artificielle Mythes et réalités*, Classe virtuelle de la Délégation Académique du Numérique Educatif, Feb. 2, 2019; *Intelligence Artificielle Mythes et réalités*, Médiathèque George Sand, Palaiseau, Feb. 9, 2019.
- Michèle Sebag - Journées Scientifiques Inria, Lyon 2019; Centre de Recherches Interdisciplinaires, Workshop on Artificial Intelligence and Women Empowerment (Oct. 2019); CRI, *Open AI: From big data to smart data* (Nov. 2019).
- Paola Tubaro - *Le Micro-Travail en France : derrière l’automatisation, de nouvelles précarités au travail ?* CFE-CGC Orange, Paris, 01/07/2019; *Le Micro-Travail en France*, Fondation Gabriel Péri, Paris, 26/06/2019; *Big data et société : vie privée, travail, inégalités*, Banque de France, 06/06/2019.

CQFD Project-Team

9.3. Popularization

9.3.1. Internal or external Inria responsibilities

Alexandre Genadot is a member of the Commission des emplois de recherche Inria BSO. Pierrick Legrand is a member of the commission consultative section 26 of the IMB.

MATHRISK Project-Team (section vide)

SIMSMART Project-Team

8.3. Popularization

8.3.1. Interventions

Patrick Héas has made a CS workshop for middle school students based on the ideas of 'Computer Science Unplugged'.

TOSCA Team

9.4. Popularization

9.4.1. Interventions

C. Henry gave a presentation at the Inria Café In on the topic of breakup of elongated particles such as spaghettis.

9.4.2. Creation of media or tools for science outreach

- A. Lejay is editor of the project *Success Stories* (AMIES and FSMP) dedicated to create 2-page sheets to present successful interactions between industry and academia.