UNIVERSITY OF MILAN
Selection procedure for recruiting associate professors under art.18, paragraph 1 and 4, of Law No.240/2010 for competition sector 03/C1 – Chimica Organica (scientific-disciplinary sector CHIM/06 – Chimica Organica) at the Department of Pharmaceutical Sciences, (announcement published in Official Gazette No. 35 of 04/05/2021) - Competition code 4585

Andrea Renzetti
CURRICULUM VITAE

PERSONAL DATA (DO NOT WRITE YOUR PERSONAL ADDRESS AND LANDLINE OR MOBILE PHONE NUMBER)

Surname	Renzetti
Name	Andrea
Date of Birth	6 May 1978

EDUCATION

DEGREE

Laurea Specialistica in Chimica e Tecnologia Farmaceutiche
University of Chieti-Pescara, 21 July 2004
Final grade: 110/110 cum laude
Thesis title: Studio termodinamico e cinetico dell'effetto del solvente sulla tautomeria cheto-enolica del 2-nitrocicloesanone e catalisi del tetracloruro di titanio nella condensazione di Yonemitsu.

PhD

Dottorato di Ricerca in Scienze del Farmaco
University of Chieti-Pescara, 9 January 2009
Thesis title: Yonemitsu-type condensations promoted by Lewis acids

PhD in Pharmaceutical Sciences
University of Reims (France), 14 May 2008
Thesis title: Yonemtsu-type condensations promoted by Lewis acids
Mention: Très bien

OTHER QUALIFICATIONS

Erasmus student, University of Reims (France), 2000/01 – 2000/06. Passed the following exams (marks): Pharmaceutical Chemistry (18/20), Pharmacognosy (16/20), Antibiotics and Antivirals (16/20), Semiology and Pathology (14/20), Research training (18/20).

Abilitazione all'esercizio della professione di farmacista, University of Chieti-Pescara, 15 June 2005.

European Computer Driving License (ECDL), Core Level, Associazione Italiana per il Calcolo Informatico (AICA), 2005.

Cambridge School of Graphology Foundation Course, Distinction, 2016.

Level 7 Diploma in Translation (DipTrans), Chartered Institute of Linguists (CIOL), 20 April 2020.

TEACHING QUALIFICATIONS

COURSES AND MODULES

2005 – 2006	University of Chieti-Pescara, *Chimica e Tecnologia Farmaceutiche*: Organic Chemistry II, lectures, 100 students, 10 hours. Qualitative Organic Analysis, demonstrations*, 20 students, 80 hours
2006 – 2007	University of Chieti-Pescara, *Chimica e Tecnologia Farmaceutiche*: Organic Chemistry II, lectures, 10 hours
2007 – 2008	University of Chieti-Pescara, *Chimica e Tecnologia Farmaceutiche*: Qualitative Inorganic Analysis, demonstrations*, 20 students, 60 hours
2015 – 2016	University of Cambridge (UK), Chemistry degree course: Organic chemistry 3rd year, demonstrations*, 40 students, 56 hours
2016 – 2017	University of Cambridge (UK), Chemistry degree course: Organic chemistry 3rd year, demonstrations*, 40 students, 24 hours
	Reach Cambridge Summer School (UK), Leader Program: Organic Chemistry, lectures, 15 students, 7 hours Pharmaceutical Chemistry, lectures, 15 students, 7 hours Biotechnology, lectures, 15 students, 7 hours
	Reach Cambridge Summer School (UK), Scholar Program: Organic Chemistry, lectures, 20 students, 3 hours Pharmaceutical Chemistry, lectures, 20 students, 3 hours Pharmacology, lectures, 20 students, 6 hours
2018 – 2019	Northwest A&F University (China), Biology degree course: Life and Organic Chemistry, lectures, 41 students, 50 hours
	University of the Ryukyus (Japan), *Global Science Campus* project: Organic Chemistry, lectures, 40 students, 3 hours Pharmaceutical Chemistry, lectures, 40 students, 3 hours
2019 – 2020	University of the Ryukyus (Japan), *Global Science Campus* project: Organic Chemistry, lectures, 40 students, 3 hours Pharmaceutical Chemistry, lectures, 40 students, 3 hours Scientific presentation skills, lectures, 7 students, 15 hours
	Ehime University (Japan), *Ehime Global Science* project: Organic Chemistry, lectures, 20 students, 4 hours Pharmaceutical Chemistry, lectures, 20 students, 4 hours
	Kyushu University (Japan), *Kyushu University Future Creators in Science* project: Scientific presentation skills, lectures, 40 students, 3 hours
2020 – 2021	University of the Ryukyus (Japan), *Global Science Campus* project: Organic Chemistry, lectures, 40 students, 3 hours Pharmaceutical Chemistry, lectures, 40 students, 3 hours

* demonstrations = *supervisioni presso i laboratori didattici*

THESES SUPERVISIONS

Master theses

2005 – 2006	University of Chieti-Pescara, *Chimica e Technologia Farmaceutiche*, 1 student, 6 months
2007 – 2008	University of Chieti-Pescara, *Chimica e Technologia Farmaceutiche*, 1 student, 6 months
2008 – 2009	University of Chieti-Pescara, *Chimica e Technologia Farmaceutiche*, 1 student, 6 months
2020 – 2021	University of the Ryukyus (Japan), Science of Education (speciality: chemistry), 1 student, 12 months

Bachelor theses

2018 – 2019	University of the Ryukyus (Japan), Science of Education (speciality: chemistry), 3 students, 3 months each
2019 – 2020	University of the Ryukyus (Japan), Science of Education (speciality: chemistry), 3 students, 12 months each
2020 – 2021	University of the Ryukyus (Japan), Science of Education (speciality: chemistry), 1 student, 12 months

TUTORIAL ACTIVITIES

2005 – 2006	University of Chieti-Pescara, *Chimica e Technologia Farmaceutiche*, *Chimica Organica I* and *Chimica Organica II*, 204 hours
2006 – 2007	University of Chieti-Pescara, *Chimica e Technologia Farmaceutiche*, *Chimica Organica I* and *Chimica Organica II*, daily
2006 – 2007	University of Chieti-Pescara, *Farmacia*, *Chimica Organica*, daily
2007 – 2008	University of Chieti-Pescara, *Chimica e Technologia Farmaceutiche*, *Chimica Organica I* and *Chimica Organica II*, daily
2007 – 2008	University of Chieti-Pescara, *Farmacia*, *Chimica Organica*, daily
2008 – 2009	University of Chieti-Pescara, *Chimica e Technologia Farmaceutiche*, *Chimica Organica I* and *Chimica Organica II*, daily
2008 – 2009	University of Chieti-Pescara, *Farmacia*, *Chimica Organica*, daily

EXAMINATIONS AND EXTERNAL EXAMINER TASKS

2016 – 2017	University of Cambridge (UK): marked assignments in practical sessions of the 3rd year Organic Chemistry module (40 students, 24 hours).
2017 - 2018	University of Cambridge (UK): assessed and marked the entry examination tests for the degree course in Chemistry (>100 tests).
2018 – 2019	Northwest A&F University (China): designed, administered, and scored the final written exam for the Life and Organic Chemistry course (41 students).
2019 – 2021	University of the Ryukyus (Japan): selected high school students for participation in the first and second year of the *Global Science Campus* project.

SEMINARS

1. "Discovery of new anticancer drugs: research experience and social challenges", Northwest A&F University, Yangling (China), 20 September 2018.

2. "Life and research experience in five countries", Northwest A&F University, Yangling (China), 12 and 14 September 2018.

3. "Polyfunctional heterocycles in drug discovery: diversity-oriented synthesis and chemico-physical analysis", RIKEN Center for Biosystems Dynamic Research, Kobe (Japan), 8 June 2018.

4. "Life and research experience in five countries", Osaka City University, Osaka (Japan), 14 April 2018.

5. "Life and research experience in five countries", Kyuyo High School, Minamitobaru (Japan), 23 February 2018.

6. "Life and research experience in several countries", Osaka City University, Osaka (Japan), 28 April 2017.

7. "Si—CN bond-cleavage of silylcyanides by an iron catalyst. A new route of silyl cyanide formation", Gunma University, Kiryu City (Japan), 31 March 2017.

8. "Synthesis of phthalides by dehydrogenative coupling of benzoic acids and alkenes", University of the Ryukyus, Nishihara (Japan), 14 September 2014.

9. "Rh-catalyzed coupling reaction of benzoic acid and ethyl vinyl ketone: C—C and C—O bond formation via C—H activation", Osaka City University, Osaka (Japan), 2 October 2012.

PEDAGOGICAL TRAINING

Study programmes

"Teaching Associate's Programme (TAP)", University of Cambridge (UK), 2016/10 – 2017/09.
Studied the main theories of adult learning by reading research literature and discussing with peers; put the theory into practice by doing teaching activities; gained feedback from peers and students and gave feedback to them through teaching observations; reflected on practice and feedback to develop my personal teaching philosophy and design my own course; submitted a TAP portfolio for final examination and became an Associate Fellow of the Higher Education Academy after passing the exam (ref. PR133240).

Higher education courses and workshops

"Learning to teach", two one-day seminars, McGill University, 2012 and 2013. Learnt teaching philosophy and techniques from teachers in various disciplines and experienced the use of clickers.

"Undergraduate demonstrations in chemistry", one-day seminar, University of Cambridge (UK), 2015. Gained an overview of a lab course organization, demonstrators' responsibilities, equipment use, and safety issues.

"Undergraduate supervisions in chemistry", one-day seminar, University of Cambridge (UK), 2016. Learnt the purpose and arrangement of supervisions, how to develop a fruitful interaction with

students, how to set and mark their work, what to do when things go wrong, and which type of relationship I should develop with students.

"Postdocs: lecturing, an introduction (Sciences)", one-day seminar, University of Cambridge (UK), 2016. Learnt how to get students involved during lectures, what are useful ways of starting and ending a lecture, what are the issued involved in large lectures and how to solve them.

"PhD supervisions", one-day seminar, University of Cambridge (UK), 2016. Learnt common issues that may arise in the supervisions of PhD research students and discussed possible solutions with peers and teacher.

METHODS OF TEACHING AND ASSESSMENT

My teaching experience started more than fifteen years ago, when I was an undergraduate student. I gave private classes in several subjects (chemistry, physics, biology and astronomy) to four high school students during four years. As a result, three out of four students almost doubled their original mark passing the final exam. This activity let me build self-confidence, develop some teaching skills and realise my passion for teaching. The selection of textbooks and the use of mini-demonstrations during class were of paramount importance for students learning. For instance, the approach described by Liliana Mammino in Oggi, Chimica (Loescher Publisher, 2000), based on the use of molecular models, was crucial for students to learn how to balance chemical equations.

When I became a PhD student, I continued private teaching by giving classes to undergraduate students in organic chemistry, which was my major. Again, the choice of textbooks proved to be crucial for the development of problem-solving skills. As a PhD student first, then as a postdoctoral researcher, I also got involved in several teaching activities at the University of Chieti (Italy): tutorials, research supervisions, lectures and demonstrations. Tutorials involved individuals or small groups of 2-4 students. In tutorials, students were asking questions related to class topics or problem solving either in person (by visiting me during lab hours) or by email. This form of teaching was extremely helpful in the development of my teaching skills. I was forced to review and practice the course material on a daily basis, consolidating knowledge and building self-confidence. Most importantly, by having one-to-one interactions with students, I was able to observe their learning process closely. I could understand how they think, what they find difficult and why, an opportunity not offered by large-size lectures. This insight stimulated me to tailor my teaching practice to the learning style of students, achieving the maximum benefit for them.

At the University of Chieti-Pescara, I also supervised three research students working on their undergraduate thesis on a daily basis, for a total of 18 months. The first three months required a large investment of time and effort to make students familiar with lab instruments and techniques. Each experiment was introduced by an explanation of the theoretical principles related to it. Practical training took part in three steps. First, I let the students observe me while I was doing the experiment. Then, students repeated the experiment while I was observing them. Finally, they performed the experiment alone. The last three months required minimum supervision: I only set a general work plan, leaving students free to organize their own work and to test their own ideas. Students found this gradual approach highly effective in building self-confidence and skills.

Lectures were mostly review sessions in preparation for mid-term exam. They covered specific topics (organometallic compounds and pericyclic reactions) that students were finding particularly challenging. Students appreciated the fact that I was providing a step-by-step guide to problem solving, while recalling useful elements of theory. They felt this approach helped them significantly in preparing for the final exam. Their feedback encouraged me to follow a skills-based approach in my future lectures. From my perspective, lectures provided a formidable training in my emotional control in front of a large audience (up to 100 students). They also offered the opportunity to use and evaluate various teaching tools: whiteboard, power point and giant molecular models.

Demonstrations were related to courses where students learnt the basic techniques of synthesis, purification, and analysis of organic and inorganic compounds. As these were introductory courses to laboratory research, my priority as a demonstrator was to make students feel comfortable and safe in the lab, so that they could build self-confidence and eventually develop manipulative skills. At the University of Cambridge, my teaching experience has been limited to demonstrations, yet it played an important role in the improvement of my teaching skills. The undergraduate chemistry experiments in Cambridge were much more complex than those I had demonstrated in Italy, in terms of both underlying theory and experimental practice. Additionally, for the first time I gained experience in assessment by marking the students' lab work assignments. The final grade was an average of two grades: one for the experimental work (yield, characterization, and purity of products), another for write-up (completeness and discussion of results).

At the University of the Ryukyus, I have consolidated my experience in large-size classroom teaching. I use two types of materials in lectures: slides (all personally prepared) and practical activities to promote active learning. In the Organic Chemistry class, students use molecular models to build simple molecules and understand structural isomerism. They also smell four samples of compounds (two enantiomers of carvone and two enantiomers of limonene) to understand the importance of stereochemistry and the relationship between three-dimensional structure and macroscopic properties such as smell. In the Pharmaceutical Chemistry class, students play a puzzle game in which each piece represents a molecular fragment, and they need to combine the pieces to find the correct structure of drug. The purpose of the game is to illustrate the challenges of the early phases of the drug discovery process. In the Presentation Skills class, students practice the basic skills needed to give a presentation: posture and eye contact, gestures, voice inflection, the creation and explanation of effective visuals, and the story message. These activities are described in Speaking of speech (by David Harrington & Charles LeBeau, MacMillan Publishing, 2009).

ABILITY TO PRODUCE TEACHING MATERIALS

1. Made slides for all of my lectures and presentations.

2. Made teaching materials for practical activities during face-to-face class:
   a) four glass vials containing the enantiomers of limonene and carvone for students to smell and understand how stereochemistry affects compounds' properties.
   b) puzzle game to explain the challenges of the drug discovery process. Each piece of puzzle is a molecular fragment, and students need to assemble the pieces to find the correct structure of drug.
   c) two polarizing filters to be oriented parallelly and perpendicularly to each other to show the effect on the passage of light.
   d) Prepared the reagents and equipment described in the *Journal of Chemical Education* **2013**, *90*, 1658 for a pharmaceutical chemistry experiment in which students synthesized an antibiotic and test its bioactivity.
   e) Had students build molecular models of small compounds to understand the three-dimensional structure of molecules and structural isomerism.
   f) Used molecular models to explain how to balance chemical equations.

3. Shipped teaching materials described above in 1), 2), and 5) to students so that they could play practical activities from home during online class.

4. Reviewed the university textbooks from Fatima Longo and Alessandro Iannucci "Unitutor Medicina" (Zanichelli Publisher, Italy, 2020) and "Unitutor 50 simulazioni" (Zanichelli Publisher, Italy, 2018).

REFLECTION ON TEACHING PRACTICE AND FUTURE DEVELOPMENT

Main features of current teaching practice

- Ask students open-ended questions during lectures and have them use clickers to stimulate their participation and the active building of knowledge.
- Follow a step-by-step approach to help students build their knowledge from what they already know.
- Each concept is explained, then immediately practices through problems to develop problem-solving skills.
- Modify teaching techniques (e.g., theory- vs applications-based) according to students' learning style.
- Design courses according to the model of constructive alignment of teaching, learning and assessment, i.e., creating a link between learning objectives, teaching activities and assessment tasks to achieve real learning.
- Choose learning objectives as to satisfy to the SMART principle: specific, measurable, achievable, realistic, and relevant.
- Recommend textbooks based on one major criterion: clarity.
- Try to look kind, friendly, and approachable to boost teaching through non-verbal communication.

Thought on future development

My teaching philosophy, as any human activity, is not perfect. In the future I would like to improve as a teacher using the same approach of experiential learning followed during the Teaching Associates' Programme. I will: 1) study of theories of adult learning; 2) practice through teaching activities; 3) collect feedback from students and peers; and 4) reflect on feedback to elaborate new theory and improve practice. I will write down these reflections and apply to become a Fellow of the Higher Education Academy.

Specifically, I will:

- Continue my pedagogical training through literature reading, workshops, conferences, online videos and discussions with colleagues.
- Include more discussions and exercises into my sessions to stimulate the active participation of students. The use of clickers will be beneficial to engage them in classroom exercises while promoting peer-learning.
- Run the self-assessment exercise on a regular basis to improve students' performance.
- Gain feedback from peers through teaching observations regularly (twice a year).
- Create more detailed feedback questionnaires to obtain information on the students' level at the beginning of the course and their progress towards learning outcomes, and hence the effectiveness of my teaching method.
- Modify the content, style, and assessment method of the Organic Chemistry course according to students' feedback.
- Explore of the educational system in other countries. How do students learn in countries with different cultures and systems of values? Do those teaching strategies work well, and why? Is there a way we can take the best aspects from each educational system and combine them together to improve teaching practice, despite the strong cultural differences? People with multiple nationalities or living in more than one country undergo the influence of various cultures, getting used to think in several ways. This multicultural approach makes people better and might benefit the educational system as well.

STUDENTS' AND PEERS' RATINGS

1. Students' ratings

Scores

9.90/10 (Life and Organic Chemistry course, Northwest A&F University, China, 2018)
9.14/10 (Medical Sciences & Chemistry course, Reach Cambridge Summer School, UK, 2017)
8.30/10 (Biotechnology course, Reach Cambridge Summer School, UK, 2017)
83% (clarity), 81% (enjoyment), 78% (usefulness): drug discovery class, Ehime University, Japan, 2019.

Comments

Reach Cambridge Summer School (UK), Organic Chemistry course, Leader Program, 2017

- His kindness and approach towards students is definitely something that makes him stand out from other teachers.
- As a new teacher, he was very passionate about chemistry and gave us tasks so that everyone could understand.
- Very sweet and nice. Very easygoing and gives opinion in a way that doesn't hurt others.He has a way of saying things when they are negative in a good way. I like how he teaches but chemistry isn't really my favorite. But the way he taught it was amazing.
- Very good at explaining.
- Andrea was a great teacher and mentor. Even though he hasn't taught for very long his enthusiasms for his work shines through.
- He is very knowledgeable and teaches a lot of useful information; however sometimes he can be less engaging.
- Great teacher but I would have loved a bit more interaction with students during the class.
- The best teacher of the course.

Organic Chemistry I and II tutorial activities, University of Chieti-Pescara, 2009

- […] Se solo ci fossero professori come te, chiari e cristallini come sei tu quando spieghi qualcosa, credo seriamente che tutti gli studenti avrebbero più voglia di studiare. Almeno è ciò che è capitato a me […]
- Andrea, è tutto molto chiaro tranne che per una cosa. Se un composto carbonilico senza idrogeni in alfa, ad esempio il benzofenone, reagische con l'idrossilammina per formare un nitrone, poi il nitrone può dare una cicloaddizione 1,3-dipolare col bromoetene? Spero che non sia una domanda stupida. Ad ogni modo grazie mille. Fantastica la spiegazione sulla trasposizione di Favorskii.
- Le tue email mi fanno pensare a come eri… a come sei… preparato, educato e disponibile […]
- Giuro che non ho mai trovato nessuno che spiega la chimica organica come te… come se stessi parlando di pane e acqua.

2. Peers' ratings

Ten-minute lecture (Teaching Associate Program, University of Cambridge, 2017)

- Clear, good pace. I found your style positive, human, approachable, and friendly.
- Clear and accessible. You see enthusiasm and passion which are contagious!!
- Really engaging manner of presenting. Infectious enthusiasm! Nice visual aids (e.g. picture of enantiomer binding/non-binding. Overall, really interesting + clear presentation!
- Very clear and confident lecturing style. Gave the lecture a nice flow. Aims are clear, reading list is good and supported by explanation. Content of slides was excellent. Slides numbering was helpful.
- Very enjoyable and human manner of speaking, with clearly structured and presented slides!

Senior demonstrations (University of Cambridge, 2017)

- Relaxed and informal communication style. I encourage you to maintain this aspect in your teaching practice.

RESEARCH QUALIFICATIONS

SCIENTIFIC PUBLICATIONS

Journal articles

1. "Dibenzoate esters of cis-tetraline-2,3-diol as analogs of (−)-epigallocatechin gallate: synthesis and crystal structure of anticancer drug candidates", Ryan Noboru Rutherford, Shinji Ura, Tak-Hang Chan, Kozo Fukumoto, Takanori Nishioka e Andrea Renzetti*, *Acta Crystallographica Section C* (Wiley) **2020**, *C76*, 1085–1095 (IF_{2020} = 1.090). https://doi.org/10.1107/S2053229620014916
2. "Antibacterial green tea catechins from a molecular perspective: mechanisms of action and structure-activity relationships", Andrea Renzetti*, Jonathan W. Betts, Kozo Fukumoto e Ryan Noboru Rutherford, *Food and Function* (Royal Society of Chemistry), **2020**, *11*, 9370–9396 (IF_{2020} = 4.171; menzionato in 6 tweet). https://doi.org/10.1039/D0FO02054K
3. "Direct synthesis of *N*-functionalized dipropargylamine linkers as models for use in peptide stapling", Andrea Renzetti*, Ryan Noboru Rutherford, Kozo Fukumoto, Dominique Kunciw, Hannah F. Sore e David R. Spring*, *Synlett* (Springer), **2019**, *30* (19), 2153 – 2156 (IF_{2019} = 4.025). www.thieme-connect.com/products/ejournals/abstract/10.1055/s-0039-1690217
4. "Determination of the absolute configuration of conformationally flexible molecules by simulation of chiro-optical spectra: a case study", Michele Mancinelli, Roberta Franzini, Andrea Renzetti, Emanuela Marotta, Claudio Villani e Andrea Mazzanti*, *RSC Advances* (Royal Society of Chemistry) **2019**, *9*, 18165–18175 (IF_{2019} = 3.267). https://doi.org/10.1039/C9RA03526E
5. "Synthesis of phthalides and α,β-butenolides by transition metal-catalyzed activation of C—H bonds", Andrea Renzetti* e Kozo Fukumoto, *Molecules* (MDPI) **2019**, *24*, 824–883 (IF_{2019} = 3.309; menzionato in 1 tweet). https://doi.org/10.3390/molecules24040824
6. "Rhodium-catalyzed Tandem Dehydrogenative Coupling-Michael addition: Direct Synthesis of Phthalides from Benzoic Acids and Alkenes", Andrea Renzetti*, Hiroshi Nakazawa e Chao-Jun Li*, *RSC Advances* **2016** (Royal Society of Chemistry), *6*, 40626–40630 (IF_{2016} = 3.233). https://doi.org/10.1039/C6RA07671H
7. "Biological and Mechanistic Characterization of Novel Prodrugs of Green Tea Polyphenol Epigallocatechin Gallate Analogs in Human Leiomyoma Cell Lines", Reda Saber Ibrahim Ahmed, Gang Liu, Andrea Renzetti, Pershang Farshi, Huanjie Yang, Claire Soave, Ghassan Saed, Ashraf Ahmed El-Ghoneimy, Hossny Awad El-Banna, Robert Foldes, Tak-Hang Chan* e Q. Ping Dou*, *Journal of Cellular Biochemistry* (Wiley) **2016**, *117*, 2357–2369 (IF_{2016} = 3.206; menzionato in 2 tweet, 2 pagine Facebook e 1 brevetto). https://doi.org/10.1002/jcb.25533
8. "Diastereomer interconversion via enolization: a case study", Andrea Renzetti*, Antonello Di Crescenzo, Feilin Nie, Andrew D. Bond, Stéphane Gérard, Janos Sapi, Antonella Fontana e Claudio Villani, *Chirality* (Wiley) **2015**, *27*, 779–783 (IF_{2015} = 2.083). https://doi.org/10.1002/chir.22503
9. "$TiCl_4$-promoted condensation of methyl acetoacetate, isobutyraldehyde, and indole: a theoretical and experimental study", Andrea Renzetti*, Alessandro Marrone*, Stéphane Gérard, Janos Sapi, Hiroshi Nakazawa, Nazzareno Re e Antonella Fontana, *Physical Chemistry Chemical Physics* (Royal Society of Chemistry) **2015**, *17*, 8964–8972 (IF_{2015} = 4.707). https://doi.org/10.1039/C4CP05412A
10. "Yonemitsu-type condensations catalysed by proline and $Eu(OTf)_3$", Andrea Renzetti*, Emanuela Boffa, Marco Colazzo, Stéphane Gérard, Janos Sapi, Tak-Hang Chan, Hiroshi Nakazawa, Claudio Villani e Antonella Fontana, *RSC Advances* (Royal Society of Chemistry) **2014**, *4*, 47992–47999 (IF_{2014} = 4.063). https://doi.org/10.1039/C4RA08853K
11. "A rhodium-catalyzed cascade cyclization: direct synthesis of *N*-substituted phthalimides from isocyanates and benzoic acids", Xian-Ying Shi, Andrea Renzetti, Soumen Kundu e Chao-Jun Li*, *Advanced Synthesis and Catalysis* (Wiley) **2014**, *356*, 723–728 (IF_{2014} = 5.910). www.onlinelibrary.wiley.com/doi/full/10.1002/adsc.201300834
12. "Si—CN bond-cleavage of silylcyanides by an iron catalyst. A new route of silylcyanide formation", Andrea Renzetti, Nobuaki Koga e Hiroshi Nakazawa*, *Bulletin of the Chemical Society of Japan*

(Chemical Society of Japan) **2014**, *87*, 59–68 (IF_{2014} = 2.255; selezionato come articolo di copertina). https://doi.org/10.1246/bcsj.20130206

13. "Multicomponent reaction studies: Yonemitsu-type trimolecular condensations promoted by Ti(IV) derivatives", Stéphane Gérard, Andrea Renzetti, Bérangère Lefevre, Antonella Fontana, Paolo De Maria, and Janos Sapi*, *Tetrahedron* (Elsevier) **2010**, *66*, 3065–3069 (IF_{2010} = 3.126). https://doi.org/10.1016/j.tet.2010.02.025
14. "Condensation of ß-diester Titanium enolates with carbonyl substrates: a combined DFT and experimental investigation", Alessandro Marrone, Andrea Renzetti, Paolo De Maria, Stéphane Gérard, Janos Sapi, Antonella Fontana*, and Nazzareno Re*, *Chemistry - A European Journal* (Wiley) **2009**, *15*, 11537–11550 (IF_{2009} = 5.585). https://doi.org/10.1002/chem.200901595
15. "Disaggregation of single-walled nanotubes (SWNTs) promoted by the ionic liquid-based surfactant 1-hexadecyl-3-vinylimidazolium bromide in aqueous solution", Antonello Di Crescenzo, Davide Demurtas, Andrea Renzetti, Gabriella Siani, Paolo De Maria, Moreno Meneghetti, Maurizio Prato, and Antonella Fontana*, *Soft Matter* **2009** (Royal Society of Chemistry), *5*, 62–66 (IF_{2009} = 4.996). https://doi.org/10.1039/B812022F
16. "A $TiCl_4/Et_3N$-promoted three component condensation between aromatic heterocycles, aldehydes and active methylene compounds", Andrea Renzetti, Emmanuel Dardennes, Antonella Fontana, Paolo De Maria, Janos Sapi* e Stéphane Gérard*, *The Journal of Organic Chemistry* (American Chemical Society) **2008**, *73*, 6824–6827 (IF_{2008} = 4.165; menzionato in 1 brevetto). https://doi.org/10.1021/jo800529q
17. "Synthesis of chiral 2',3'-pyranone(pyrrolidinone)-fused tryptamines", Emmanuel Dardennes, Árpad Kovács-Kulyassa, Andrea Renzetti, Janos Sapi, and Jean-Yves Laronze*, *Tetrahedron Letters* (Elsevier) **2003**, *44*, 221–223 (IF_{2004} = 2.476). https://www.sciencedirect.com/science/article/pii/S0040403902025376

Book chapters

1. "Discovery of Green Tea Polyphenol-Based Antitumor Drugs: Mechanisms of Action and Clinical Implications" Reda Saber Ibrahim Ahmed, Claire Soave, Tracey Guerin Edbauer, Kush Rohit Patel, Yasmine Elghoul, Antonio Vinicius Pazetti de Oliveira, Andrea Renzetti, Robert Foldes, Tak-Hang Chan*, and Q. Ping Dou* Chapter 14 In *Medicinal Plants*, (Springer), **2019**, 313 – 332. https://link.springer.com/chapter/10.1007/978-3-030-31269-5_14

RESEARCH EXPERIENCE

1. Yonemitsu–type condensations promoted by Lewis acids

University of Reims (France), pre-doctoral trainee, 2001/09 and 2003/05 – 2003/07;
University of Reims (France), PhD fellow, 2006-2007.

Joined the research group of Prof. Janos Sapi and coordinated a project between the Universities of Chieti-Pescara and Reims (France).

Developed a three–component condensation reaction of heterocycles, aldehydes, and active methylene compounds to afford polyfunctionalized aromatic heterocycles of biological interest. The reaction is promoted by Ti(IV) and Et3N or catalyzed by lanthanide(III) salts and amino acids. The product can be further functionalized into non–standard amino–acids and analogs of natural products (tryptamines and azatoxins).

2. Study of reaction mechanisms

PhD fellow, University of Chieti-Pescara, Department of Pharmacy, 2005;
Postdoctoral fellow, University of Chieti-Pescara, Department of Pharmacy, 2008/02 – 2009/05.

Joined the organic chemistry research group of Prof. Paolo De Maria and coordinated a project in collaboration with the inorganic chemistry group within the same department.
Studied the mechanism of the Ti(IV)-promoted three-component condensation reaction by a combination of theoretical calculation and experimental techniques (NMR, IR and UV-Vis spectroscopy). The study was crucial to tune the reaction conditions and maximize yield.

3. Study of stereochemical properties

Marie Curie Intra-European fellow, University of Cambridge (UK), 2015/02 – 2017/02.

Joined the research group of Prof. David Spring and participated in a project in collaboration with the universities of Roma, Bologna, and Chieti-Pescara.

The stereochemical stability of a pure diastereomer issued from the three-component reaction was studied by 1H-NMR and HPLC in non-aqueous solvents. The two techniques highlighted a diastereomer-interconversion mechanism via enolization. The absolute configuration of another conformationally flexible chiral compound was determined by X−ray crystallography and electronic circular dichroism.

4. Iron-catalyzed metathesis reactions

JSPS Postdoctoral fellow, Osaka City University (Japan), 2009/10 – 2011/10.

Joined the research group of Prof. Hiroshi Nakazawa and participated in a project in collaboration with Nagoya University (Japan).

Discovered the first metathesis reaction between silanes and silyl cyanides involving the recombination of their Si—H and Si—CN bonds. The reaction is catalyzed by a cheap iron complex, proceeds through the formation of a peculiar η^2-silylimino metal complex, and provides a new method for the synthesis of silanes and silyl cyanides. The reactin mechanism was studied by a combination of DFT calculations and experimental techniques.

5. Iron-catalyzed C—F bond cleavage reactions

JSPS Research Invitational Fellow, Osaka City University (Japan), 2014/03 – 2014/05;
Postdoctoral researcher, Osaka City University (Japan), 2014/05 – 2015/01.

Joined the research group of Prof. Hiroshi Nakazawa.

Found preliminary evidence for a C—F bond cleavage reaction in perfluoronitriles in the presence of silanes and an iron complex under photoirradiation.

6. Iron-catalyzed synthesis of silyl sulfides

JSPS Research Invitational Fellow, University of the Ryukyus (Japan), 2017/03 – 2017/04;
Visiting researcher, University of the Ryukyus (Japan), 2018/01 – 2018/03.

Joined the research group of Prof. Kozo Fukumoto.

Developed an iron-catalyzed metathesis reaction between organic sulfides and tertiary silanes involving the recombination of their S—C and Si—H bonds. The reaction affords a silyl sulfide and a quaternary silane.

7. Synthesis and biological evaluation of analogs of green tea polyphenols

Research Associate, McGill University (Canada), 2012/01 – 2014/01.

Joined the research group of Prof. Tak-Hang Chan. Participated in a project in collaboration with McGill University Hospital, *Viteava Pharmaceuticals* company (Canada), and the University of Cambridge (UK).

Synthesized 28 analogs of the green tea polyphenol epigallocatechin gallate (EGCG) featuring the removal of catechol moiety to prevent enzymatic degradation and the protection of OH groups to increase cell permeability. Five analogs displayed higher inhibitory activity than EGCG against uterine leiomyoma cancer cells. Two other analogs displayed higher antibacterial activity than EGCG against *methicillino-resistant Staphylococcus aureus* (*MRSA*) and *S. aureus Newman*.

8. Synthesis and biological evaluation of analogs of Okinawan plants polyphenols

Associate professor, University of the Ryukyus (Japan), 2019/01 – 2021/03;
Director of PAK Research Center, University of the Ryukyus (Japan), 2021/05 – now.

Leading and coordinating several projects in collaboration with Shishu University (Japan), Matsuyama University (Japan), the University of Oxford (UK), the University of Surrey (UK), and Griffith University (Australia).

Synthesized 30 analogs of the green tea polyphenol epigallocatechin gallate (EGCG) for evaluation of antibacterial activity (University of Surrey), anti-neuroinflammatory activity (Matsuyama University), and DYRK1A kinase folding inhibition (Shinshu University). Hits were found for each target. The crystallographic structure has been determined for some compounds. The mechanisms of antibacterial activity of green tea catechins has also been reviewed. Structure optimization is underway to turn hits into leads. The development of two drug delivery systems based on ultrasound-activated microbubbles (University of Oxford) and *E. Coli*-engineered polyester beads is also in progress.

9. Polo-like kinase 1 (plk1) inhibition

Marie Curie Intra-European Fellow, University of Cambridge (UK), 2015-2017.

Joined the research group of Prof. David Spring (Department of Chemistry) and participated in a project in collaboration with the Department of Biochemistry.

Three approaches were followed to develop inhibitors of polo-like kinase 1 (plk1), a kinase overexpressed in many human cancers: (a) One peptidomimetic macrocyle was identified by virtual screening and synthesized but showed no activity. (b) Functionalizable dipropargylamine and dialkyne linkers suitable for peptide stapling were synthesized. (c) In a fragment-based approach, small molecules were identified by virtual screening, synthesized, and tested by fluorescence polarization assay to evaluate their binding affinity to plk1. Two of them, which showed activity, were connected by a bridge to form a larger molecule that also inhibits plk1.

10. Drug discovery by mRNA technique

Visiting researcher, University of Tokyo, 2018/04 – 2018/08.

Joined the research group of Prof. Hiroaki Suga and worked on a project in collaboration with another group member (Mareike Wiedmann).

Selected bioactive compounds from a collection of about 100 billion peptides using the mRNA display technique (biological targets : cofactor-independent phosphoglycaretae mutase [iPGM] of Staphylococcus aureus and Trypanosoma brucei). Hits with weak binding affinity were identified.

11. Synthesis of ionic liquids

Postdoctoral fellow, University of Chieti, 2008-2009.

Joined the research group of Prof. Paolo De Maria and participated in a project in collaboration with the University of Trieste.

A major limitation in the use of single-walled carbon nanotubes (SWCNTs) as drug delivery systems is their limited solubility in water. To address this issue, I synthesized the ionic liquid surfactant 1-hexadecyl-3-vinyl-imidazolium bromide, which proved to be effective in dispersing SWCNTs in water.

COOPERATION WITH NATIONAL AND INTERNATIONAL RESEARCH GROUPS

Prof. Antonella Fontana (University of Chieti-Pescara): study of reaction mechanisms, since 2008.

Prof. Alessandro Marrone (University of Chieti-Pescara): DFT calculations, since 2008.

Prof. Claudio Villani (University of Rome "La Sapienza"): study of stereochemical properties and HPLC analyses of enolizable compounds, since 2014.

Dr. Jonathan Betts (University of Surrey, UK): antibacterial activity of EGCG analogs, since 2019.

Dr. David Wibowo (Griffith University, Australia): polymers produced by bioengineered E.coli as drug delivery systems for EGCG analogs, since 2020.

Dr. Richard Browning (University of Oxford, UK): ultrasound-activated microbubbles as drug delivery systems for EGCG analogs, since 2020.

Prof. Satoshi Okuyama (University of Matsuyama, Japan): anti-neuroinflammation activity of natural products and their synthetic analogs, since 2019.

Prof. Isao Kii (Shinshu University, Japan): DYRK1A kinase folding process inhibition of natural products and their synthetic analogs, since 2018.

Prof. Toshiaki Teruya (University of the Ryukyus, Japan): insulinomimetic activity of natural products and their synthetic analogs, since 2018.

Prof. Masashi Inafuku (University of the Ryukyus, Japan): anti-hyperlipidemic activity of natural products and their synthetic analogs, since 2021.

Prof. Shinkichi Tawata (University of the Ryukyus, Japan): PAK1 kinase inhibition of natural products and their synthetic analogs, since 2021.

EDITORIAL BOARD MEMBERSHIP

2017/09 – 2018/12 Language Editor, Open Chemistry (DeGryter Poland)

SOCIETY MEMBERSHIP

2010 - Member of the Royal Society of Chemistry (MRSC)

2019 - Chartered Scientist (CSci)

2017 - Associate Fellow of the Higher Education Academy (AFHEA)

2015 -	Member of the JSPS Alumni Association of the UK and the Republic of Ireland
2020 -	Member of the Association of the Italian Researchers in Japan (AIRJ)
2014 – 2020	Member of the International Union of Pure and Applied Chemistry (IUPAC)
2016 – 2018	Member of the JSPS French Alumni Association
2013	Member of the *Société de Chimie Thérapeutique*
2005 – 2009	Member of the *Società Chimica Italiana*

INDUSTRIAL COLLABORATIONS AND PATENTS

Worked on the synthesis and evaluation of novel flavonoids in models of hematological cancer while employed at McGill University (Canada, 2012/01 – 2014/01). The project was an industrial collaboration with *Viteava Pharmaceutical* and led to a patent for which I am one of the financial beneficiaries.

HONORS AND AWARDS FOR RESEARCH ACTIVITIES

Research funds obtained as the principal investigator

Scandinavia-Japan Sasakawa Foundation Award (¥ 300,000), 2021. Project title: "Synthesis and biological evaluation of Okinawan plant polyphenols for multi-target drug discovery".

Great Britain - Sasakawa Foundation Award (¥ 200,000), 2020. Project title: "Microbubble-mediated delivery of green tea polyphenol analogs for anticancer therapy".

Great Britain - Sasakawa Foundation Small Grant (£ 1,600), 2017. Project title: "Ribosomal synthesis of nonstandard peptides and biological evaluation as protein-protein interaction (PPI) inhibitors".

Research funds obtained as the applicant and managed by the principal investigator

JSPS Invitation Fellowship for Research in Japan (¥ 594,000), 2016. Project title: "Regioselective synthesis of organosulfur compounds from thioethers with the help of a metal catalyst".

Marie Curie Intra-European Fellowship (€ 199,000), 2015-2017. Project title: "Synthesis of small molecules and evaluation of their biological activity: discovery of new protein-protein interaction inhibitors".

JSPS Invitation Fellowship for Research in Japan (¥ 1,200,000), 2013. Project title: "Synthesis and characterization of the iron complex Cp*Fe(CO)(*k*-C,N-*t*-BuMe$_2$SiC=NSi(*p*-tol)$_3$)".

JSPS Grant-in-Aid for Scientific Research (¥ 2,000,000), 2009–2011. Project title: "Synthesis of new transition-metal complexes bearing heavier main-group element ligand and creation of new catalytic activity".

JSPS Postdoctoral Fellowship (¥ 8,800,000), 2009–2011. Project title: "Synthesis of new transition-metal complexes bearing heavier main-group element ligand and creation of new catalytic activity".

Postdoctoral Fellowship from the University of Chieti-Pescara (€ 18,000), 2008-2009. Project title: "Studio dell'effetto dei tensioattivi naturali e sintetici sulle condensazioni di tipo Yonemitsu".

Travel grant from the organizing committee of the *42nd IUPAC World Congress* (£ 80), 2009.

Travel grant from the organizing committee of the *11th Royal Society of Chemistry - Società Chimica Italiana (RSC-SCI) Joint Meeting on Heterocyclic Chemistry* (€ 225), 2008.

Registration grant from the organizing committee of the 32nd Summer School "A. Corbella" (€ 300), 2007.

Registration grant from the organizing committee of the Convegno Interregionale Toscana-Umbria-Marche-Abruzzo (TUMA; € 100), 2007.

Scholarships

Visiting Scholarship from Hughes Hall Cambridge (non-stipendiary), 2017

PhD Scholarship from the French Government (€ 3,000), 2005

"Vinci" Scholarship from the French-Italian University (€ 5,100), 2005

PhD Scholarship from the University of Chieti-Pescara (€ 35,000), 2004

Erasmus Scholarship from the European Commission and the University of Chieti-Pescara (€ 2k), 1999

Awards

Bulletin of the Chemical Society of Japan (BCSJ) Award Article (non-monetary), 2014

Regional award for thesis of scientific excellence from the *Azienda per il Diritto agli Studi Univeritari di Chieti e Pescara* (€ 600), 2004

Ranked 8th at the Regional Chemistry Olympic Games organized by the *Società Chimica Italiana*, 1996

Giacomo Chiola Award from *Comune di Pescara* (€ 13), 1992

PRESENTATIONS AT INTERNATIONAL CONGRESSES AND CONFERENCES

Invited lectures

1. "Synthesis of phthalides by dehydrogenative couplings", Sustainable Science Symposium 2019, University of Hawaii, Honolulu (US), 28 March 2019.
2. "Polyfunctional heterocycles in drug discovery: diversity-oriented synthesis and chemico-physical analysis", Society of Pure and Applied Coordination Chemistry (SPACC) Mini Organic Chemistry Symposium, Nagoya Institute of Technology, Nagoya (Japan), 13 April 2017.
3. "Synthesis of small molecules and biological evaluation as polo-like kinase 1 (plk1) inhibitors", Japan-UK Research Promotion Conference, Japan Embassy in the UK, London (UK), 15 November 2016.
4. "Multicomponent synthesis of polyfunctionalised heterocycles", 2nd European Lead Factory (ELF) Annual Chemistry Learning & Achievements Meeting, Lisbon (Portugal), 3 November 2016.
5. "Exploring chemistry in the search of treasures: synthesis of new transition-metal complexes as powerful catalysts", Mini Inorganic Chemistry Symposium (MICS), Osaka City University, Osaka (Japan), 3 April 2010.

Oral communications as a speaker

1. Andrea Renzetti and Hiroshi Nakazawa "A new method for the synthesis of silyl cyanides by an iron complex', 61st Japan Society of Coordination Chemistry (JSCC) Symposium, Okayama (Japan), 17–19 September 2011.

2. Andrea Renzetti, Stéphane Gérard, Paolo De Maria, Antonella Fontana and Janos Sapi "A three component condensation reaction between heterocycles, aldehydes and methylene active compounds", 11th Royal Society of Chemistry – Società Chimica Italiana (RSC-SCI) Joint Meeting on Heterocyclic Chemistry, Lerici, 8–11 May 2008.

3. Andrea Renzetti, Stéphane Gérard, Emmanuel Dardennes, Paolo De Maria and Janos Sapi "A multicomponent reaction based on Lewis acids and enolizable compounds", XXVII European School of Medicinal Chemistry (ESMEC), Urbino, 1–6 July 2007 (oral and poster communication).

4. Andrea Renzetti, Stéphane Gérard, Emmanuel Dardennes, Paolo De Maria and Janos Sapi "Una nuova condensazione di tipo Yonemitsu basata su enolati di titanio", 32nd Summer School "A. Corbella", Gargnano, 18–22 June 2007.

Poster communications (*presenting author)

1. Aya Kina*, Yuto Tomori, Andrea Renzetti, Kozo Fukumoto, and Eiji Asato 'Iron-catalyzed bond cleavage reaction in thioethers' (poster), 101st Chemical Society of Japan (CSJ) National Meeting, Tokyo (Japan), 19–22 March 2021.

2. Shizuki Aniya*, Yuiko Otani*, Isao Kii, Jonathan Betts, Kozo Fukumoto and Andrea Renzetti "New antibacterial and anti-Parkinson drugs derived from green tea polyphenols", Okinawa Attractive Science and Engineering Symposium (OASES), Nishihara (Japan), 14–28 September 2020.

3. Ryan Rutherford*, Shinji Ura, Noriyuki Natsume, Aki Yamano, Tak-Hang Chan, Kozo Fukumoto, Andrea Renzetti and Toshiyuki Teruya "Glucose uptake activity of EGCG analogs in skeletal muscle cells", 9th International Conference on Polyphenols and Health (ICPH), Kobe (Japan), 28 November – 1st December 2019.

4. Ryan Rutherford*, Shinji Ura, Noriyuki Natsume, Aki Yamano, Tak-Hang Chan, David Spring, Kozo Fukumoto, Andrea Renzetti and Toshiyuki Teruya "Synthesis of polyphenols and amines of biological interest", Okinawa Attractive Science and Engineering Symposium (OASES), Nishihara (Japan), 31 August 2019.

5. Janos Sapi, Stéphane Gérard, Antonella Fontana, Alessandro Marrone, Nazzareno Re, Andrea Renzetti*, Andrew Bond, Feilin Nie and Claudio Villani "Synthesis of polyfunctionalized heterocycles for drug discovery", 97th Chemical Society of Japan (CSJ) Annual Meeting, Tokyo (Japan), 16–19 March 2017.

6. Andrea Renzetti*, Hiroshi Nakazawa and Chao-Jun Li "Synthesis of phthalides from benzoic acids and alkenes by a rhodium-catalyzed tandem reaction", 6th International IUPAC Conference on Green Chemistry (ICGC-6), Venezia, 4–8 September 2016.
7. Andrea Renzetti*, Hiroshi Nakazawa and Chao-Jun Li "Synthesis of phthalides from benzoic acids and alkenes by a rhodium-catalyzed tandem reaction", 27th European Colloquium on Heterocyclic Chemistry (ECHC), Amsterdam (The Netherlands), 3–8 July 2016.

8. Andrea Renzetti*, Nobuaki Koga and Hiroshi Nakazawa "Si–CN bond cleavage of silyl cyanides by an iron catalyst. A new route of silyl cyanide formation", 26th International Conference on Organometallic Chemistry (ICOMC), Sapporo (Japan), 13–18 July 2014.

9. Xian-Ying Shi, Andrea Renzetti*, Soumen Kundu and Chao-Jun Li "Synthesis of phthalimides from benzoic acids and isocyanates by a rhodium-catalyzed cascade cyclization", 26th International Conference on Organometallic Chemistry (ICOMC), Sapporo (Japan), 13–18 July 2014.

10. Andrea Renzetti* and Hiroshi Nakazawa "Iron-catalyzed σ-Bond Metathesis Reactions of Si—H and Si—CN Bonds. A New Route to Silylcyanides", 18th European Symposium on Organic Chemistry (ESOC), Marseille (France), 7–12 July 2013.

11. Andrea Renzetti*, Emanuela Boffa, Marco Colazzo, Stéphane Gérard, Janos Sapi, Tak-Hang Chan and Antonella Fontana "Green Yonemitsu-type condensations", 18th European Symposium on Organic Chemistry (ESOC), Marseille (France), 7–12 July 2013.

12. Andrea Renzetti*, Alessandro Marrone, Stéphane Gérard, Janos Sapi, Nazzareno Re and Antonella Fontana "Yonemitsu-type condensations promoted by Ti(IV) derivatives", 49èmes Rencontres Internationales de Chimie Thérapeutique (RICT), Nice (France), 3–5 July 2013.

13. Stéphane Gérard, Andrea Renzetti*, Alessandro Marrone, Bérangère Lefevre, Emmanuel Dardennes, Nazzareno Re, Antonella Fontana and Janos Sapi "Ti(IV) promoted multicomponent approaches for the preparation of poly(heterocyclic) systems", 13th Belgian Organic Synthesis Symposium (BOSS), Louvain (Belgium), 15–20 July 2012.

14. Andrea Renzetti*, Antonella Fontana, Stéphane Gérard, Janos Sapi and Paolo De Maria "How to make the trimolecular condensation of indole, isobutyraldehyde and methyl acetoacetate green and catalytic", 42nd IUPAC World Chemistry Congress, Glasgow (UK), 2–7 August 2009.

15. Andrea Renzetti*, Alessandro Marrone, Stéphane Gérard, Nazzareno Re, Janos Sapi, Antonella Fontana and Paolo De Maria "Condensazioni di tipo Yonemitsu promosse da $TiCl_4$", 8th Sigma-Aldrich Young Chemists Symposium (SAYCS), Pesaro, 20–22 October 2008 (oral and poster communication).

16. Andrea Renzetti*, Alessandro Marrone, Stéphane Gérard, Nazzareno Re, Paolo De Maria, Antonella Fontana and Janos Sapi "The trimolecular condensation of indole, dimethyl malonate and various aldehydes", 2nd European Chemistry Congress (EuChemS), Torino, 16–20 September 2008.

17. Andrea Renzetti*, Alessandro Marrone, Nazzareno Re, Stéphane Gérard, Antonella Fontana, Paolo De Maria and Janos Sapi "Yonemitsu-type condensations promoted by Ti(IV): a combined DFT and experimental investigation", 23rd International Conference on Organometallic Chemistry (ICOMC), Rennes (France), 13–18 July 2008.

18. Andrea Renzetti*, Stéphane Gérard, Emmanuel Dardennes, Paolo De Maria and Janos Sapi "A multicomponent reaction based on Lewis acids and enolizable compounds", XXVII European School of Medicinal Chemistry (ESMEC), Urbino, 1–6 July 2007 (oral and poster communication).

19. Andrea Renzetti*, Stéphane Gérard, Emmanuel Dardennes, Guido Angelini, Paolo De Maria and Janos Sapi "A titanium-promoted trimolecular condensation", XXII European Colloquium on Heterocyclic Chemistry (ECHC), Bari, 2–6 September 2006.

20. Emmanuel Dardennes*, Árpad Kovács-Kulyassa, Andrea Renzetti, Janos Sapi and Jean-Yves Laronze "Enantioselective synthesis of pyrano- and pyrrolidino-β-carboline from a common intermediate", 3rd French-Italian Meeting on Organic Chemistry, Pisa, 21–23 November 2002.

21. Emmanuel Dardennes*, Árpad Kovács-Kulyassa, Andrea Renzetti, Janos Sapi and Jean-Yves Laronze "Synthesis of chiral heterocycle-fused β-carboline derivatives", 7ème Symposium de l'Institut de Chimie de Substances Naturelles, Gif-sur-Yvette (France), 30–31 May 2002.

RESEARCH STATEMENT

Research vision

Medicinal chemistry. Why is it so difficult to discover new drugs? There are two important reasons: (1) synthetic compounds used for experimental screening are usually obtained by combinatorial synthesis; therefore, they look all the same and have a low probability to contain an active compound. (2) Compounds are usually tested on a single biological target, so their full biological potential remains unexplored. To increase drug discovery rate, it is necessary to increase the diversity of both screening compounds and biological targets. New regions of chemical and biological space need to be explored. The issue can be solved using a combination of diversity-oriented synthesis (DOS) and multi-target assays. DOS generates products that have not only different functional groups and stereochemistry, but also different scaffold and therefore high structural diversity.

Green chemistry. Non-polluting reactions are the dream of any synthetic chemist. What will the typical reaction look like in the future? Chances are that it will be a C—H bond functionalization reaction, which uses unactivated starting materials with generation of little or no waste. Reactions of this type are revolutionizing organic synthesis; however, most of them still use toxic or expensive metals (Co, Ni, Rh, Ir, Pd) as catalysts; thus, they are unsuitable for large-scale applications. The use of metals can be reduced but not completely avoided, because metals provide a unique reactivity due to their coordination ability. Iron is the best alternative to traditional metals as it is safe and extremely cheap (0.02 €/mol); yet coupling reactions catalyzed by iron are still rare because it is difficult to control iron (especially Fe^0) reactivity.

Outline of research plan at the University of Milan

Medicinal chemistry. In this project, three compound libraries will be prepared using DOS approach and tested against various targets to maximize the chances to find hits. The first compound library includes small molecules prepared from a common starting material using a branching cascade approach. The starting material will be obtained by a multicomponent reaction. By varying the partners of the multicomponent reaction, it will be possible to change the starting material, thus exploring a different region of chemical space. The second library includes non-standard peptides obtained from non-standard amino acids by cell-free synthesis technique, which allows the synthesis of long peptides (>100 amino acid residues) with no purification necessary. The third library contains analogs of natural polyphenols, which display a wide range of bioactivities. Compounds will be tested to evaluate the following biological activities: DYRK1A folding inhibition, PAK1 inhibition, gankyrin inhibition, antibacterial activity, anti-neuroinflammation, and insulinomimetic activity, exploting the current network of collaborators.

Green chemistry. The goal of this project is to develop new C—H bond functionalization reactions catalyzed by iron using unactivated coupling partners. Traditional coupling reactions of type R—M + X—R ---> R—R' + M—X (R, R' = alkyl or aryl, M = metal, X = halogen) will be turned into their eco-friendly version R—H (or R—OH) + H—R' ---> R—R' + H_2 (or H_2O) by screening multiple conditions (catalyst, additive, oxidant, solvent, and temperature). Two types of iron compounds will be tested: common salts of type FeX_2 and FeX_3 (X = OTf, OAc, Cl…) in the presence of base additives (MOAc, $MHCO_3$, M_2CO_3, PhCOOM [M = Li, Na, K, Cs]) to generate the active species in situ; and organometallic complexes with well-defined geometry structurally related to ruthenium, the metal most similar to iron.

OTHER PROFESSIONAL ACTIVITIES

MANAGEMENT ACTIVITIES

- Member of the organizing committee of the international online workshop *2021 Visionary Leader Program* (8-10 March 2021), organized by the University of the Ryukyus (Japan), Tokyo University of Agriculture and Technology (Japan), and Can-Tho University (Vietnam).

- Member of the steering committee and sub-coordinator of the *Global Science Campus (GSC)* project, University of the Ryukyus (Japan), 2019/01 – 2021/03.

  In this project, the best high school students from Japan get affiliated to the university for one or two years. During this time, they take science classes from university professors and do research activities in a university laboratory. The goal of the project is to encourage the most talented students to undertake university studies in STEM subjects, giving them the tools to make a smooth transition from high school to university while exposing them to an international environment. Students are admitted to the GSC program after successful examination. 40 students are selected for the first year (theoretical training), and 15 for the second year (practical training).

  Duties as a committee member: advertised the project to the community, recruited students, organized the program agenda, and managed the communication with foreign universities.
  Duties as sub-coordinator: managed all the educational activities involving the use of English language, helped students prepare research presentations in English, and accompanied them abroad to attend international conferences.

  Allocated personal funds:
  2019: 200,000 JPY (1,500 euro).
  2020: 400,000 JPY (3,000 euro).

  Results:
  Three GSC students under my supervision (Ryan Noboru Rutherford, Shizuki Aniya and Yuiko Ootani) presented their research results at four local conferences and two international conferences.

- Tutor of Erasmus students, University of Chieti-Pescara (2001 – 2009): helped two incoming French students get oriented in the Italian university and five outgoing Italian students prepare their leave.

PEER-REVIEW OF JOURNAL ARTICLES

Green Chemistry (Royal Society of Chemistry): 9 reviews
Synlett (Springer): 2 reviews
Journal of Chemical Education (American Chemical Society): 2
Food & Function (Royal Society of Chemistry): 2
Advanced Synthesis and Catalysis (Wiley): 1
The Journal of Organic Chemistry (American Chemical Society): 1
Organic Letters (American Chemical Society): 1
New Journal of Chemistry (Royal Society of Chemistry): 1
European Journal of Inorganic Chemistry (Wiley): 2
RSC Advances (Royal Society of Chemistry): 2
Chemistry – An Asian Journal (Wiley): 1
Asian Journal of Organic Chemistry (Wiley): 1
ACS Sustainable Chemistry & Engineering (American Chemical Society): 1
Organic and Biomolecular Chemistry (Royal Society of Chemistry): 1

PEER-REVIEW OF BOOKS

Zanichelli Editore (Bologna), 2018: reviewed the chemistry section of the university science textbook *Unitutor 50 simulazioni* by Fatima Longo and Alessandro Iannucci.

Zanichelli Editore (Bologna), 2020: reviewed the chemistry section of the university science textbook *Unitutor Medicina* by Fatima Longo and Alessandro Iannucci.

TRANSLATIONS

Zanichelli Editore (Bologna), 2017-2018: translated the university science textbook *Principles of Chemistry* by Peter Atkins (7th edition) from English into Italian (sections: Focus 7, Focus 8, Preface, Self-tests, and Answers to odd-numbered exercises; 183 pages total).

CONSULTING

Zanichelli Editore (Bologna), 2004: translated the university science textbook *Principles of Chemistry* by Peter Atkins (7th edition) from English into Italian (Focus 7, Focus 8, Preface, Self-tests, and Answers to odd-numbered exercises; 183 pages total).

LANGUAGES

English

Accelerated Professional Program, level B1, 2005, evaluation: excellent;
Test of English as a Foreign Language – internand-Based Test (TOEFL-iBT), 2005, score: 88/120;
Test of English for International Communication (TOEIC), 2007, score: 860/990.

French

Diplôme Approfondi de la Langue Française, Level C2 (DALF C2), 2009, score: 100/100;
Test d'évaluation du Français adapté au Québec (TEFaQ), 2014, scores: 333/360 (listening), 342/450 (conversation).

Japanese

Japanese Language Proficiency Test, level 4 (JLPT N4), 2011, score: 97/180.

Chinese

Cambridge University Language Programme, level A1 (CULP A1), 2015 (86.4/100);
Cambridge University Language Programme, level A2 (CULP A2), 2016 (72.8/100);
Cambridge University Language Programme, level B1 (CULP B1), 2017 (71.7/100).

Italian

Native speaker.

Date 3 June 2021 Place Nakagusuku (Japan)