



COST

**Understanding and Controlling
Nano and Mesoscale Friction
MP1303**

Start date: 08/10/2013

End date: 07/10/2017

Year: 1

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Chair

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Scientific context and objectives

- **Background / Problem statement:** To strengthen, organize, and merge scientific and technological competencies in the field of micro/nanotribology, by means of the integration of research capacities. The better coordinated research will lead to innovative solutions to, e.g., the industrial problems of hi-tech companies, such as novel coatings and molecular lubrication strategies. (1/2)
- **Brief reminder of MoU objectives:** Coordinate the present activities and stimulate innovation. Support gender balance and involvement of ESR. Promote dissemination and advertising within and outside the Action. Team up and prepare applications for future joint training and research projects.



Scientific context and objectives

(2/2)

- **Research directions:** Cooperation of experimental and simulation approaches. Thru extensive networking: WG meetings, STSMs, workshops, training schools, plus knowledge dissemination.
- This Action fosters research in *atomic scale* friction and dissipation, and its connection with friction at longer length scales. A large number of European researcher in this field are now participating.



Working groups

- **Working group 1: Bridging tribological mechanisms at different scales**
First meeting Oct. 2014
- **Working group 2: Tuning nanofriction**
Met June 2014
- **Working group 3: Confined systems under shear**
First meeting Sept. 2014
- **Working group 4: Controlled nano movement**
Met June 2014

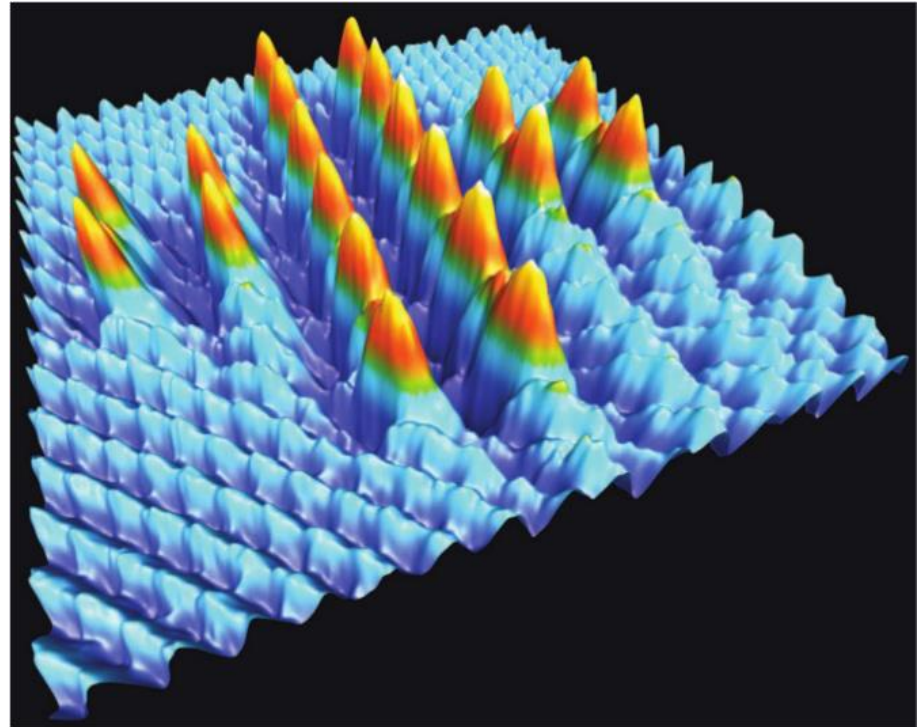


Results vs. Objectives

- Several collaborations have started already, triggered by meeting and fueled especially by STSMs.
- While a few collaborations were already on the go, several additional ones are starting thanks to the COST Action. Already 14 publications (26-06-14) acknowledge MP1303.
- Dissemination is lagging behind expectations, but we have already involved a number of industries. The web site <http://www.nanofriction.org/> is already a running tool for the exchange of information.

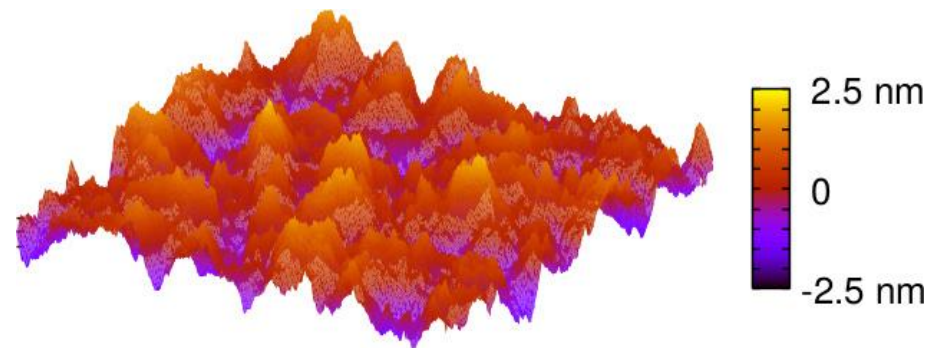
Significant Highlights in Science and Networking (1/3)

Single-atom AFM manipulation at room temperature, plus mapping based on local AFM-tip power dissipation (WG2 + WG4, collaboration between Switzerland, Finland and Japan). Published in Nature Commun. 5:4403 (2014)



Significant Highlights in Science and Networking (2/3)

Friction and universal scaling laws for randomly rough rubber contacts. The contact area for any sliding speed follows a universal master curve (WG1, collaboration between Germany and Italy).



Significant Highlights in Science and Networking (3/3)

- 9 STSMs: developing international collaborations
- 60 participants to the general Workshop, including 2 from industrial partners (Toyota and Novo Nordisk)





Future Plans

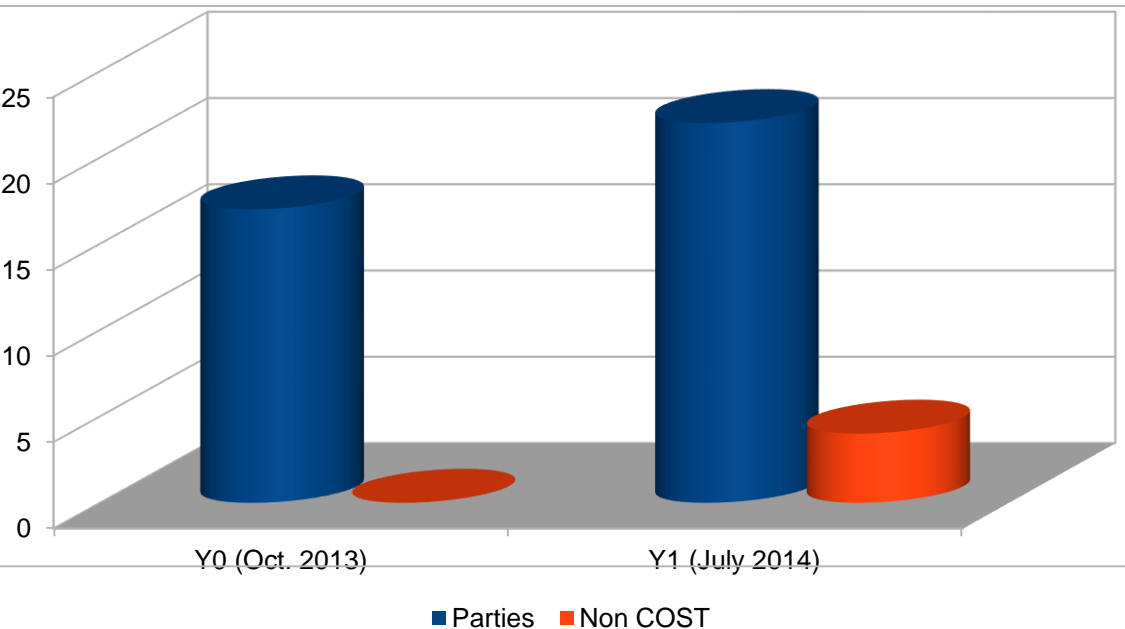
- STSMs are very successful: expand to 12-15
- Training School 2014 was largely appreciated too: increase support from 10 to 15 participants in 2015
- Promote in-WG and cross-WG exchanges
- Organize a good-sized international conference, with strong outreach value
- Produce an outreach publication to advertise the scientific & technological contents of MP1303 (e.g. to companies) likely in *EU Research* magazine



Appendix

- The following three slides should be prepared for information only in case of questions from the DC but should NOT be presented

Action Parties



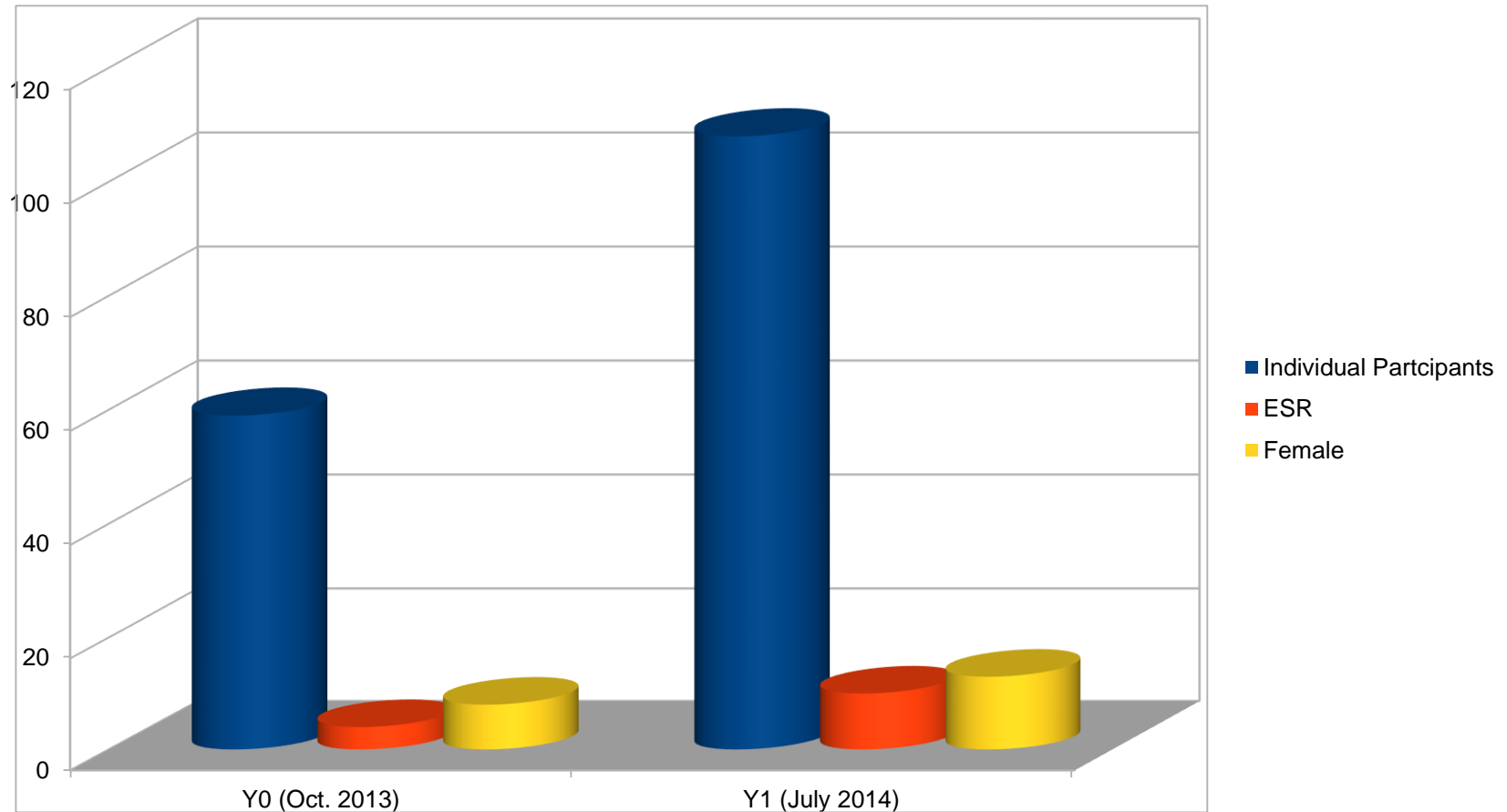
Grant Holder:

|GH Institution: Radboud university Nijmegen

|GH Scientific Representative: prof. Annalisa Fasolino

|GH Country: Netherlands

Action participants



Use of COST Instruments

MC/WG Meetings	4			
STSMs	9			
Training Schools	1			
Workshops or Conferences	1			
Joint Publications	14			