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**Elasto-hydrodynamic lubrication of ball bearings and drops**<sup>1</sup> PASQUALE DELL'AVERSANA, MARS Center, Napoli, MARCELLO LAPPA, MARS Center, Napoli, G. PAUL NEITZEL, Georgia Institute of Technology It has been recently pointed out that liquids can be lubricated similarly to solids through the imposition of relative surface motion, e.g., using thermocapillarity or forced convection. Here we examine some aspects of drop lubrication that exhibit astonishing similarities, but also differences, with conventional ball bearings that undergo elasto-hydrodynamic lubrication. Despite the fact that a drop, considered as a bearing, is able to carry a very small load compared with a normal ball bearing, the lubrication channels in the two cases have similar characteristics. On the other hand, a drop can only work in fully hydrodynamic regime, because boundary lubrication and what tribologists call starvation of lubricant lead to the immediate rupture of the drop and loss of the lubricating film. The idea underlying our discussion is that there is much to learn from drop lubrication because, as long as the drops remain intact, they behave somehow like ideal bearings. Numerical simulations based upon experimental data compare the performances of naturally shaped lubrication channels with those of channels that have been machined with some basic profiles.

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- Prefer Oral Session  
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**Elasto-hydrodynamic lubrication of ball bearings and drops**

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