In Memory

D. Ornstein

Ratner with (left to right) Ornstein, Yakov Sinai, and Jack Feldman, 1978.

Marina Ratner was a good friend and colleague. Although we never wrote a joint paper, we did work together, and I was able to gain great appreciation for the depth of her mathematical ability. The commitment to her family was very impressive; she homeschooled her grandchildren. She was not a fan of affirmative action and made it very clear that she wanted her achievements to be rated solely on her mathematics not her gender.

I would like to call attention to Marina's work on the horocycle flow, which I hope will not be overlooked in the

light of her later and more spectacular results. The study of the horocycle flow and the geodesic flow as flows on an abstract measure space began in 1938 with the work of Hedlund and Hopf. While the geodesic flow is the most random measure preserving flow on an abstract measure space, the horocycle flow has the opposite behavior. Marina elucidated its rigidity properties.

I will give just one example. If two horocycle flows on the quotient space M of $SL(2, \mathbb{R})$ by a discrete subgroup are the same as measure preserving flows, then the underlying surfaces are conformally isometric. This means that even though we replaced M by an abstract measure space, the flow retains all of the geometry that we threw out.

Credits

Photo is courtesy of Anna Ratner.

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