A Puzzle

Professor to Grad Student: I was at a party last night with three other people. The product of their ages is 2450 and their sum is twice your age. How old are they?

Grad Student (after thinking for a long time): I don’t have enough information.

Professor: Yes, but it will help if I tell you I was the oldest one there.

Graduate Student: But I don’t know how old you are!

Professor: You can tell me that too.

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How old are the professor, the graduate student and the three other people at the party?—There is only one unique answer and no guessing is allowed.