## Abstract

Experimental and numerical studies were presented to reveal the flow and heat transfer characteristics of [nanofluid](https://www.sciencedirect.com/topics/engineering/nanofluid) [laminar flow](https://www.sciencedirect.com/topics/engineering/laminar-flows) over the [microscale](https://www.sciencedirect.com/topics/engineering/microscale) backward-facing step (MBFS). The duct inlet and the step height were 400 μm and 600 μm respectively. All the walls considered adiabatic except the downstream wall is heated by [uniform heat flux](https://www.sciencedirect.com/topics/engineering/uniform-heat-flux). The experiment is conducted at the [Reynolds number](https://www.sciencedirect.com/topics/engineering/reynolds-number) range from 280 to 470. The distilled water is considered as a base fluid with two types of [nanoparticles](https://www.sciencedirect.com/topics/engineering/nanoparticle) SiO2 and Al2O3 immersed in the base fluid. The particle diameter is 30 nm and the range of nanoparticles volume fraction in the base fluid varied from 0 to 0.01. The measurement results revealed that the water–SiO2 nanofluid has the highest [Nusselt number](https://www.sciencedirect.com/topics/engineering/nusselt-number). It is found also that the Nusselt number increase with increases volume fraction. The water–SiO2 nanofluid with [higher volume fraction](https://www.sciencedirect.com/topics/engineering/high-volume-fraction) has the highest Nusselt number. The [friction factor](https://www.sciencedirect.com/topics/engineering/friction-factor) of water–Al2O3 was higher than of water–SiO2 mixture. The numerical results were in good agreement with the measurement results.