

Division of Mechanical Science and Engineering	Research field	Thermal Energy Systems	Lab. ID MS28
Laboratory web site	http://www.me.se.kanazawa-u.ac.jp/netsu/		
Research subjects			
<p>In recent years, a great deal of research effort has been directed toward developing new technology for realizing a low-carbon emission society. In our laboratory, new technologies and thermal systems have been studied to utilize thermal energy and natural energy efficiently. The research fields are divided into three categories : (1)development of new energy conversion system such as thermoacoustic engine using low temperature waste heat, (2)development of heat transfer enhancement technique for efficient utilization of thermal energy such as improvement of a heat exchanger, (3) thermal science and its application of heat transfer phenomena with phase change such as evaporation, condensation, solidification and melting.</p>			
Master/Doctor course: Education policy, curriculum, typical activity in the laboratory			
<p>The students decide their practical subject for the Master or Doctor thesis and belong to one of the research groups, after consultation with staffs. The students are encouraged to go for outer activities, participating research workshops/meetings, international or domestic conferences. The laboratory is managed by a weekly labo-meeting which staffs and DC students must attend, where all policies and practical financial supports for research are discussed and determined. Education policy of our laboratory is that observation of phenomena and thinking of its mechanism is first step of research.</p>			
Daily life in the laboratory, etc.			
<p>Personal working desk with a personal computer is available for every student. Also the PC machine can be used for large-scale numerical calculations. All relevant students of undergraduate, Master, Doctor and post Doc researchers share the laboratory rooms, and everyday free discussion on thermal engineering or related topics are strongly encouraged. Many laboratory activities are organized like, welcome party for new comers, excursion, summer seminar with camp, etc.</p>			
Message or comments by the laboratory faculty staffs			
<p>Sen no Rikyū as the historical figure with the most profound influence on chanoyu, the Japanese "Way of Tea", said, "It is important to think about Way of Tea every time, however free and natural spirit is needed for master of chanoyu". How do you think that what do engineers think always? The technologies realize fulfillment of human life using knowledge of science. Therefore harmonization with natural environment and technologies is important. The harmonization is encouraged through feelings of comfort that is induced by enjoying life. Thus, the motto of our laboratory is "It is important to think about heat transfer every time, however spirit of enjoyment is also needed every time".</p>			
Recent Master theses in these 3 years (+ more if appropriate)			
year.month	Thesis title (including English translation of Japanese thesis title)		
2017.3	Effect of Electric Field on Freezing of Biological Tissue		
2017.3	Experimental study on refrigerant distribution and evaporation characteristics of parallel micro channels in airfoil-shaped tube		
2016.3	Performance enhancement of loop-tube-type thermoacoustic engine with branch resonator by improvement of stack structure		
2016.3	Effect of heat and mass transfer phenomena in metallic mesh structure on PEFC performance		
2016.3	Study on heat transfer characteristics of fin with built-in self-oscillating heat pipe		
2016.3	Study on heat transfer performance of finless tube heat exchanger for air conditioner under frost condition		
2016.3	Active enhancement of supercooling by utilizing high-frequency ultrasonic vibration and its application to freezing of biological tissue		
2016.3	Development of energy harvesting system utilizing thermoelectric generator with latent heat storage		
2015.3	Quantative prediction of changes of quality in food during freezing and thawing		
2015.3	Study on sonocrystallization using control of nucleation due to ultrasonic irradiation		
2015.3	Mechanism of acoustic wave generation in thermoacoustic engine with gas-liquid phase change		
2015.3	Numerical study on heat transport mechanism in self-oscillating heat pipe		
2015.3	Experimental investigation on heat transport characteristics of self-oscillating heat pipe		
2014.3	Performance improvement of loop-tube-type thermoacoustic cooler with branch resonator by utilizing multi-mesh stack		
2014.3	Combined effect of ultrasonic vibration and alternating magnetic field on supercooling of water		
2014.3	Experimental study on heat transfer characteristics of fin with built-in self-oscillating heat pipe		
2014.3	Numerical study of airfoil-shaped tube heat exchanger having extended sections		
2014.3	Optimization of cooling jacket for thermoelectric module		
2014.3	Recovery and fixation of carbon dioxide by utilizing algal biomass		
2014.3	Effects of rooftop greenery to energy saving		
2013.3	Production of fine particles by using crystallization method with multi-frequency ultrasonic irradiation		
2013.3	Development of thermoacoustic engine by utilizing gas-liquid phase change		
2013.3	Molecular dynamics simulation of ice crystal growth in electric field		
2013.3	Numerical study on heat transport characteristics of self-oscillating heat pipe		
2013.3	Study on dissolution of carbon dioxide microbubbles in sea water		
2013.3	Research on high-efficiency technology of algal biomass production		
2013.3	Development of air cleaning method by utilizing a streamer discharge with mist formation		
2013.3	Research on heat transfer performance of fin-and-tube heat exchanger by using airfoil-shaped tube		
Recent Doctoral theses in these 3 years (+ more if appropriate)			
year.month	Thesis title (including English translation of Japanese thesis title)		
2014.3	Study on performance improvement of loop-tube-type thermoacoustic cooler with branch resonator		
Laboratory mail address	Yukio Tada <tada *at* se.kanazawa-u.ac.jp>, Hajime Onishi <onishi *at* se.kanazawa-u.ac.jp>		