them start to land, the bird is also likely
to decide in favour of landing. But when
exactly do they decide to land? The
model further assumes that the birds
have different internal-energy reserves
and when a bird is on the verge of
exhausting its energy, it decides to land.
To incorporate this effect, the authors
have introduced an additional motiva-
tional parameter such that a bird with a
lower parameter value would try to land
more quickly than the others. The para-
meter also includes the effect of envi-
ronmental stimuli like foraging patches
over which the flocks fly. The exact
moment of collective landing is deter-
mimed through a competition between the
above parameters. A strong motivation in
favour of landing can be overridden by
the presence of strong propensity to fol-
low the flying neighbours. The authors
have shown using computer simulations
that, while in the absence of coupling,
birds land only due to the individual
motivations and independent of each
other, and in the presence of coupling,
the model results in a realistic dynamics
where in spite of having a large variation
in motivation, an abrupt collective land-
ing is well possible. A further and more
technical description of the model can be
found in Box 2.

Bhattacharya and Vicsek have com-
bined the dynamics of collective motion
and the process of collective decision-
making in a single model. Applications
of this model can reach well beyond the
regime of animal behaviour. This model
can be used to study phenomena like
sudden changes in the minds of voters or
consumers, emergence of panic in a
crowd, sudden outbreak of epidemic or
rumour, instantaneous changes of state in
robotic groups – spanning fields like so-
ciology, economics, psychology, control
theory and crowd management, to name
a few. We look forward to many more
interesting studies that would unravel
other natural or social phenomena with
the help of this model.

Bhattacharya, K. and Vicsek, T., New J.
Phys., 2010, 12, 093019.

ACKNOWLEDGEMENT. I thank Dr Kunal
Bhattacharya (Eötvös University, Hungary),
Dr Anindita Bhadra (IISER, Kolkata) and
Prof. Raghavendra Gadagkar (IISc, Banga-
lore) for their critical feedback.

Anjan K. Nandi is in the Centre for Eco-
logical Sciences, Indian Institute of Sci-
ence, Bangalore 560 012, India.
e-mail: anjanandi@gmail.com

Smile with Science

By - Sumanta Baruah

“I know, one day this will be known as ‘Distributed Computing’!”