COMpletely understand how it works. We can then make the
of algae needs to be ratcheted up, which can only happen once we
installations require too much maintenance. Also, the production
Netherlands. Growing algae is too labour-intensive and the
substance that you can exploit. Some minor processing is all it
takes, and you can fill your car with the stuff.
Wageningen on algae that make lipids.” That is even smarter than
“Our own Professor Roberta Croce is working with colleagues in
species of these single-cell plants also flourish in salt water.
harvesting it. I have calculated that sustainable algae production in
are full of algae. We need to realize a lakeside installation for
Generating facilities in our back yards, as it were. “With solar
To escape the energy crisis, we will have to live with power
facilities in our back yards, as it were. “With solar
panels on almost every house, as you see in Germany today. And
we need to start making better use of algae. The Loosdrecht lakes
are full of algae. We need to realize a lakeside installation for
harvesting it. I have calculated that sustainable algae production in
the Markenmeer lake alone can provide for 20 percent of our fuel
needs here in the Netherlands.” Algae are an excellent biofuel that
does not compete with our food supply, especially since many
species of these single-cell plants also flourish in salt water.

ALGAE AS DAIRY COWS
“Our own Professor Roberta Croce is working with colleagues in
Wageningen on algae that make lipids.” That is even smarter than
burning algae for power: get the algae to make an energy-rich
substance that you can exploit. Some minor processing is all it
takes, and you can fill your car with the stuff.
Grow algae as if they were dairy cows. ‘Algae energy’ is already
widespread in China, while it has not yet proved profitable in the
Netherlands. Growing algae is too labour-intensive and the
installations require too much maintenance. Also, the production
of algae needs to be ratcheted up, which can only happen once we
completely understand how it works. We can then make the
process more efficient through genetic modification. Algal growth
relies on photosynthesis, the process on which nearly all life on
ever depends. We can nourish ourselves because green plants
store energy from light in sugars. We can breathe because oxygen
is released during photosynthesis.

GREAT DISCOVERIES
This essential process of photosynthesis, which is now more
essential than ever in view of our energy needs, is what Van
Grondelle has been trying to fathom for his entire career. And he’s
been very successful! In 2009 the Royal Netherlands Academy
of Sciences rewarded him with a five-year position as a Professor of
the Academy. This means exemption from administrative duties,
fraying up his time for research and education. The previous year,
Van Grondelle received a three-million-euro grant from the
European Union. This ERC Advanced Grant, given to the best
researchers conducting the most groundbreaking research, has
enabled him to use ultra-fast lasers to research the role of
chlorophyll binding proteins in photosynthesis.
The biophysicist has been working at VU University Amsterdam
since 1983. Partly due to the appeal of the authoritative Laser
Centre, founded in 1992, he has been able to form a large,
top-notch research group. “We have made great discoveries. We
have identified the sunlight is collected and what happens when
the first decisive 20 picoseconds of photosynthesis.” One picosecond
is a trillionth of a second...

UNHAPPY
Van Grondelle works constantly, he says. Fortunately he needs
little sleep these days, otherwise he would never see his teenage
children. “I sometimes putter around at 2am... answering mails,
writing a little, catching up on my reading.” He clears his head by
going on bike rides. He enjoys the colours in the dunes by the
seaside, especially since he can no longer play much football due
an injury. Football was really his sport: “Giving someone a piece
of your mind with a few well chosen words on the football pitch,
yeah, I do that in my work, too”
The hype surrounding last summer’s discovery of the Higgs boson
did not make Van Grondelle happy. “Lots of money gets poured
into research into strange neutrons and the Higgs boson. It puts
science in a less-than-flattering light, and I disagree with that. As

Not that Van Grondelle is the only scientist working in this field:
“There are other researchers who are just as capable of achieving
these results as I am, it’s just that they aren’t able to conceptualize as
well. I have an intuitive feeling for how nature works.” In physics, a
hypothesis is usually a formula. “This approach won’t work for us;
it’s too complicated,” Van Grondelle explains. “In our work the
hypothesis consists of intuition, and I am an intuitive scientist.
I have a solid theoretical and mathematical background, but I need
to rely on my feelings when it comes to understanding life using
concepts rooted in physics.” Van Grondelle tries to teach his
students to work intuitively. “I train them by having them make
intuitive reductions of mathematical formulas.”
When he was still a student, Van Grondelle found the link between
physics and life to be lacking. “I wanted to discover how a special
combination of natural laws could lead to this spectacular result.
Natural laws are very unforgiving, Coulomb’s law, the Schrödinger
equation. In fact, there is quite a bit of confusion in the world of
physics. Life exists by virtue of disorder; evolution is a prime
example of this. Imagine that you are the supreme being.

“Nature is lubricated by an ‘engineering sauce’. I am looking for the recipe for
the sauce”
You put on your engineer’s cap to recreate everything. What would
you do? Nature is lubricated by an ‘engineering sauce’. I am
looking for the recipe for the sauce.”

NEW DIMENSION
The study of photosynthesis has become especially
exciting in recent years thanks to the work of Rienk van
Grondelle. He has added a whole new dimension to the
field, which has caused the quantum mechanics research
community to get interested in the subject. Quantum
mechanics describes the behaviour of the smallest energy
units (quantum) at the smallest (sub-atomic) level.
Van Grondelle was able to translate these
quantum mechanical processes into solar
energy to draw up a research agenda. Twenty of this
field of solar energy to draw up a research agenda. Twenty of this
