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## Butterfly visual pigments

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RIJKSUNIVERSITEIT GRONINGEN

**Butterfly visual pigments:  
molecular cloning and optical reflections**

Proefschrift

ter verkrijging van het doctoraat in de  
Wiskunde en Natuurwetenschappen  
aan de Rijksuniversiteit Groningen  
op gezag van de  
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in het openbaar te verdedigen op  
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om 16.00 uur

door

**Kürt Johan André Vanhoutte**

geboren op 23 september 1975  
te Waregem (België)

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*aan Joyce*

**Cover:** 2D topology of the amino acid sequence of the UV absorbing opsin derived from cDNA sequences obtained from the satyrine butterfly *Bicyclus anynana* (see Chapter 2).

Absorbance difference spectra representing the fast conversion of green rhodopsin into the metarhodopsin state while illuminating with intense white light after prolonged dark adaptation (see Chapter 4).

Photograph of corneal reflections after bleaching green visual pigment in the nymphalid butterfly *Polygonia c-album* (see Chapter 5).

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